SERVING THE FERTILIZER INDUSTRY 50 YEARS

Commercial Fertilizer

and PLANT FOOD INDUSTRY

February
1960

ARE YOU READY
FOR THE
SPRING RUSH?

SEE PAGE 19

Advertisement of NITROGEN DIVISION, ALLIED CHEMICAL

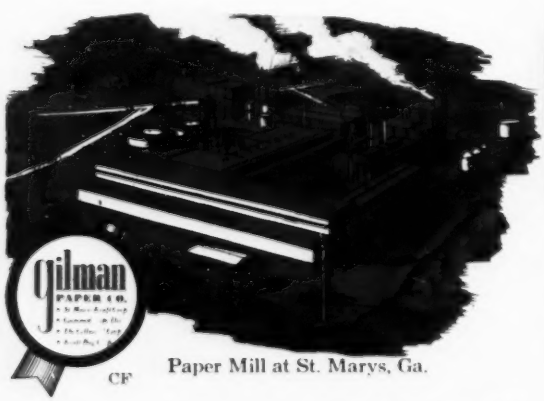
"It wasn't there last year!"

This is the new 300,000 sq. ft. addition to Kraft Bag Corporation's converting plant at St. Marys, Georgia, scheduled to go "on stream" in February.

Here, in one giant integrated operation, logs from our own forest lands are turned into pulp, then into paper, and finally into heavy duty multiwall shipping sacks, using the most modern machinery and equipment the industry affords.

This expansion of our facilities is one more step in our constant efforts to provide our customers with the best in quality and service.

We invite your inquiries.



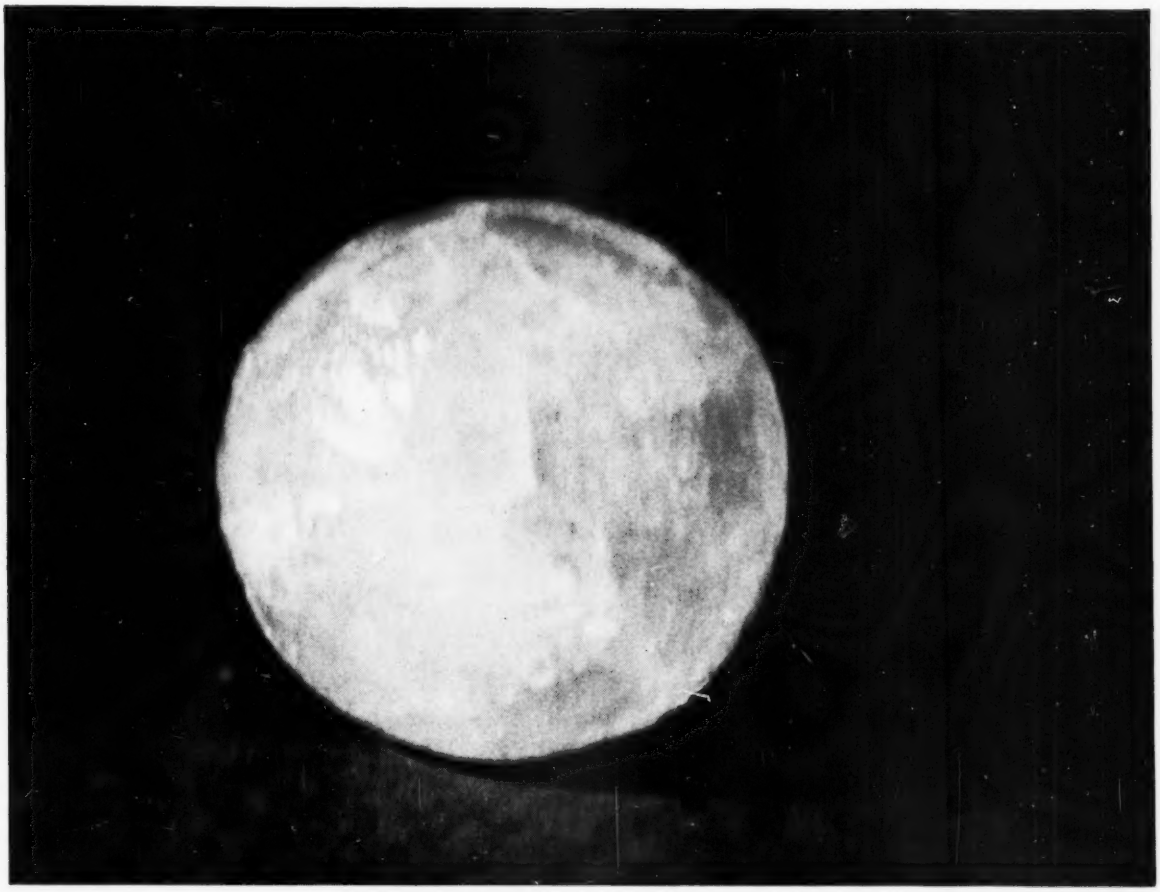
CF Paper Mill at St. Marys, Ga.

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

630 Fifth Avenue, New York 20, N. Y.

Daily News Building, Chicago 6, Ill.



Enlarged 50 times

This is probably the most unusual urea prill available in America today!

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The producer of these superior urea prills? Carbochimique of Belgium. The sole agents in the United States—H. J. Baker & Bro., Inc.

For 110 years, the Baker organization has supplied the agricultural industry with what we always believe to be the best products. These urea prills are a case in point. As a first step to seeing how much better they do the job for *you,* why not write for a free sample today. Write our office nearest you.

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OUR PLANTS PURR LIKE KITTENS

So we have been mighty busy. We have put in some hard work. We have made some mighty good friends. We are especially proud that clients are so pleased they pass the word along.

And that's the best kind of friends to have.

As we enter our 7th year this month, we look forward to making a lot more firm friends . . . and keeping busier than ever as a result.

The D. M. WEATHERLY COMPANY

Industrial Engineers and Builders

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Commenting Freely

by BRUCE MORAN

It is interesting to note how many meetings being held lately have finance on the agenda. This has been a problem facing the fertilizer industry for a long time—not in our own operations, but at the dealer level. For a dealer may be well financed himself, and still be in a bad bind if things happen to a large percentage of local crops.

There is not much doubt that the present belt-tightening in banking has brought this problem up to the surface for more careful examination. And that is good.

But the problem of farm finances is a waning thing. As the farmer gets to be more and more of a business man, as agribusiness replaces agriculture, as farms get fewer because acreage per farm gets bigger—finance will be handled as in any sound business dealings.

You can see this coming in the new attitude of the banks toward agriculture. Loans are made on character, experience, intelligence, integrity which used to be made on crops in the warehouse or the silo. Now that farmers think five years ahead, bankers can understand them better—and work with them better.

It is good!

You're really hitting the jackpot when you get <u>better</u> multiwalls for <u>less money</u> . . .

Bemis EXTENSIBLE Multiwalls

They are better than conventional multiwalls because they are shock-resistant. Two years of use prove that breakage is greatly minimized. And they frequently cost less because the greater strength lets you use a lighter basis weight bag. Read these convincing quotes from men who have had ample experience with Bemis Extensible Multiwalls . . .

"We are saving $7.10 per thousand with Bemis Extensibles, a 5½% reduction in our bag costs."

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"These extensible bags are the best paper bags we have ever used. As far as I am concerned, we won't use anything else."

"We haven't had a serious complaint since we switched to your 'stretch' bag."

"We broke only two bags in two weeks. We don't want anything else."

Bemis pioneered extensible multiwalls. We have had longer experience with them than any other bag maker. You can profit by that experience. Get in touch with your Bemis Man.

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The extra care that produces

SWIFT'S PHOSPHATES

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in your goods!

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Swift's extra care may very well offer you the opportunity to improve your customer satisfaction . . . your plant operations . . . and your profits. It's worth checking into! Have a Swift Phosphate Center Representative outline the advantages Swift offers you in phosphates—triple, rock or ground rock.

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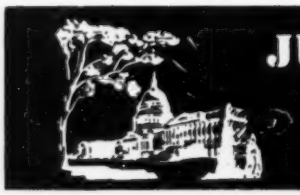
PHOSPHATE CENTER
Bartow, Florida

Swift
105TH YEAR

To Serve Your Industry Better WITH PHOSPHATE ROCK,
GROUND PHOSPHATE ROCK AND MINUTE MAN TRIPLE SUPERPHOSPHATE



JUST AROUND THE CORNER

By Vernon Mount

A BIG CHANGE is under the surface of things in Washington. The old philosophy of spending ourselves into prosperity, proven invalid in the middle thirties, has gone so far into limbo that now there is serious thinking by serious men about consumer spending.

HIGH LIVING is the way they put it. The people have too many good things, luxuries, needless labor-saving items, cars, televisions and such. That's the thinking now, because the pendulum has swung far the other way since 1952.

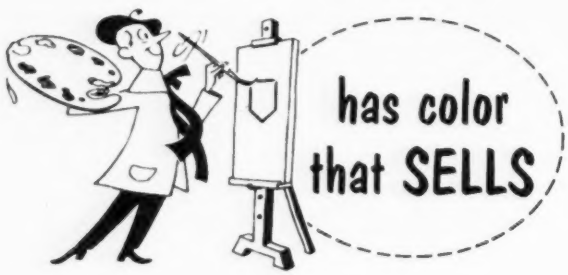
THE US has always believed that such items are not luxuries, but necessities – to be had in peace-time; to be done without in wartime. A candidate who ran on such a platform plank would not get very far. But it's in the wind. Whether it will ever blow up into a storm is another matter.

Yours faithfully,

Vernon Mount

FUR-AG

the sterilized organic conditioner



Use Fur-Ag in your mixed fertilizers and your goods take on a rich, dark color that invites sales. It reduces bag-set, speeds up curing in the pile and provides bulk. Sterilized Fur-Ag is free from plant diseases, insects, weed seeds and it's readily available all year 'round at surprisingly low cost. For full information, write for Bulletin 127.

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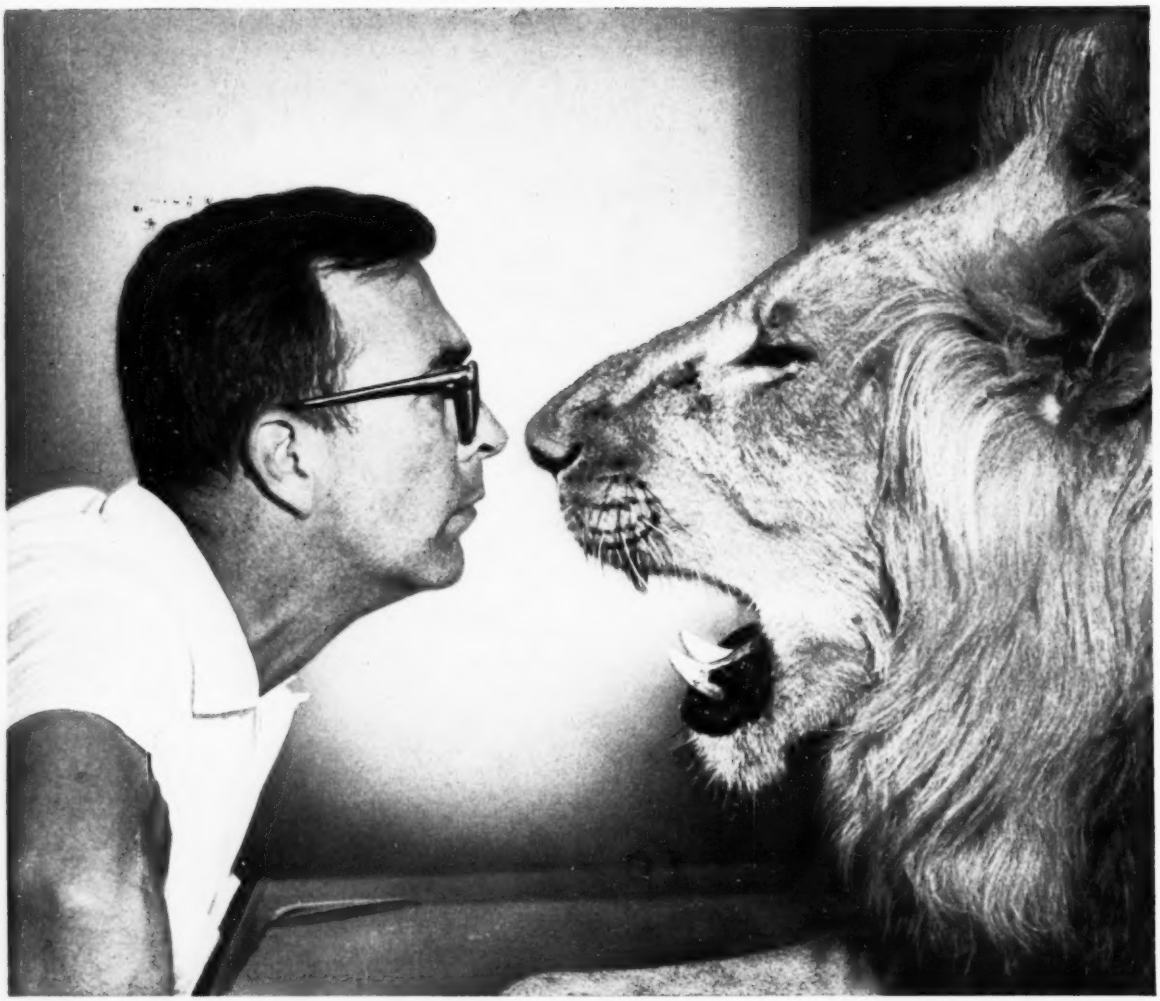


Why you should take a close look at LION E-2*

You don't have to look this close to see the advantages of selling Lion E-2 Ammonium Nitrate. The first thing you'll notice is that Lion gives you a definite storage advantage because of its super-density. An 80-lb. bag of Lion E-2 is 20 to 25% smaller than an 80-lb. bag of any other brand. Thus, the storage space you save with Lion E-2 can be used for 20 to 25% larger inventories to make more profit.

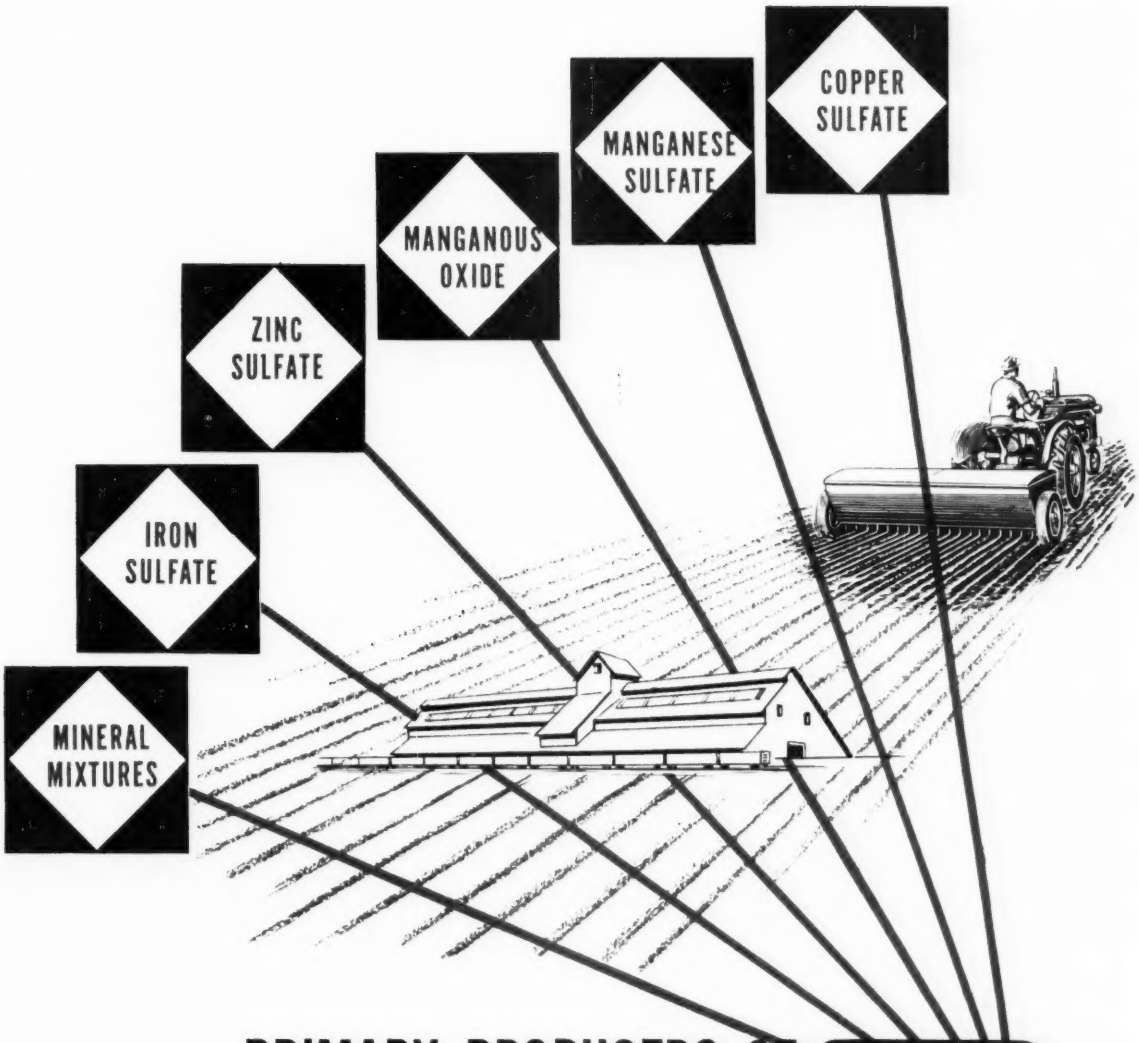
You feel the second advantage when you pick up a bag of Lion E-2. The bags are coated with Syton®, a special Monsanto antislip agent that lets you and your customers get a better grip for faster, safer handling.

Lion E-2 gives your customers another big advantage, too. Because Lion E-2 is super-dense, farmers can load more in their spreaders . . . actually eliminate one out of every five refill stops! And, Lion E-2 is guaranteed at least 33.5% vital nitrogen for maximum yields.

If you want the "lion's share" of ammonium nitrate sales in your area, take a close look at Lion E-2. You'll like what you see! Want more information? Just roar! LION E-2, Monsanto Chemical Company, St. Louis 66, Mo. LION: Reg. T. M.; *E-2: T. M. Monsanto Chemical Co.

Monsanto

LION E-2 is the only ammonium nitrate on the market that can save 20 to 25% of your valuable storage space. Because each Lion E-2 prill contains less useless air, you can stack *five* 80-lb. bags of Lion E-2 in the same space previously taken up by just *four* 80-lb. bags of any other brand. (Lion E-2 is a good deal for your customers, too. Because of E-2's super-density, farmers can eliminate one out of every five refill stops.)



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For more than thirty years we have manufactured highest quality nutritional trace elements for application in fertilizers and maintained a consistent program of research to further improve the quality and performance of these products—Our basic position and background in this field assures you of a plentiful supply of highest quality materials.

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Cut Costs, save time, plant space and effort by using our custom formulated mineral mixture service—We will supply combinations of minerals mixed to your particular specifications.

Our Products are backed with service, research and technical assistance.

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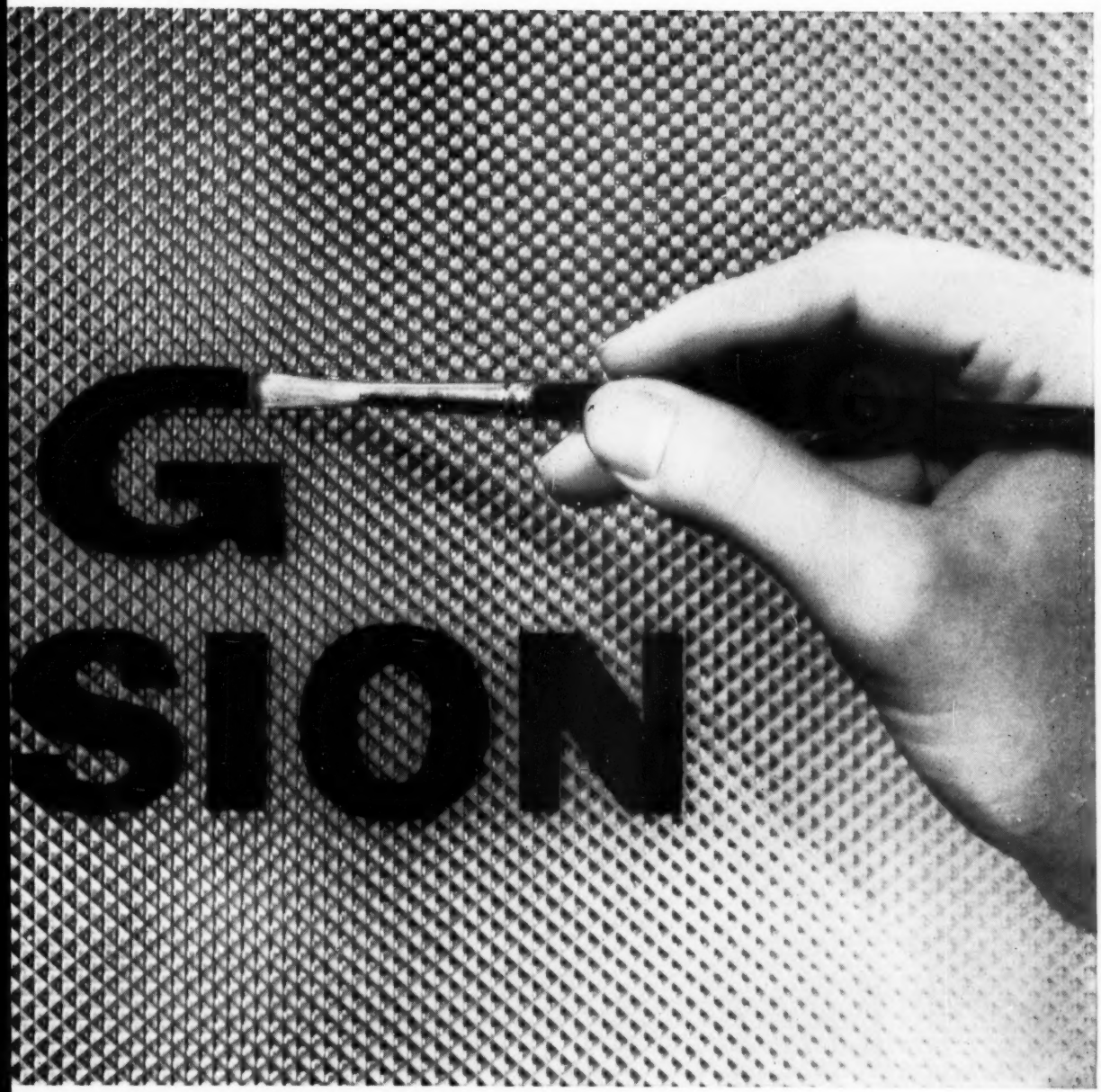
It takes only a matter of minutes to change the name on an office door. But it took months of planning to organize St. Regis' all-out program to meet the ever-changing needs of our shipping bag customers. Now, with expanded facilities, we're prepared to serve you better than ever before.

The new St. Regis Bag Division was developed to provide you with four important services: *the right bag* for your product, *the best equipment* to fill it, *an engineering staff* to help reduce your over-all packaging costs, and, wherever possible, *new packaging systems* and methods.

It's so complete in every way, we call this new program *Packaging-In-Depth.*

It was made possible by consolidating St. Regis'



basic Multiwall organization with four highly-successful and respected paper and textile bag companies. We now offer a *complete* product line: multiwall, burlap, textile, mesh . . . whatever you need. We now have *13 manufacturing plants* for more efficient coverage of key areas throughout the country where industries depend on bags for shipping their products. In these areas, a complete staff of packaging engineers is ready to give you skilled service quickly.

Our research and development facilities are now available to all segments of the new Bag Division, to explore and perfect the most advanced, most efficient packaging methods.

One thing more. The people who *make* your bag are best qualified to supply the bag filling and closing machinery for your operation. St. Regis actually designs and produces the most complete line of packaging machinery in this field: more than 50 different models.

To sum up: more *diversified* services to offer . . . more *specialized* people to meet your needs. And though our men have *years* of experience in many fields, the spirit of St. Regis' new Bag Division is young and eager. We look forward to serving you soon.

BAG DIVISION

St.Regis PAPER COMPANY

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Chemical Packaging Company • Mid-America Bag Division

preliminary report on consumption of

Commercial Fertilizers and Primary Plant Nutrients

in the U. S., year ended June 30, 1959

by
WALTER SCHOLL, MARION M. DAVIS, ESTHER I. FOX *and* CAROLINE A. WILKER
Fertilizer Investigations Research Branch
Soil and Water Conservation Research Division
Agricultural Research Service
U. S. Department of Agriculture
Beltsville, Maryland

Table 1.—Fertilizers consumed as mixtures and as materials, year ended June 30, 1959, compared with consumption of previous year, by State and region[1] (Preliminary)

State and region	Mixtures	Materials[2]	Total consumption	Total change from year ended June 30, 1958
	in thousands of tons			
Maine	171	8	179	[3]
New Hampshire	17	4	21	1
Vermont	46	20	66	8
Massachusetts	72	18	90	3
Rhode Island	15	2	17	—1
Connecticut	55	21	76	—[3]
New England	**376**	**73**	**149**	**12**
New York	547	80	627	—9
New Jersey	213	26	239	23
Pennsylvania	585	74	659	17
Delaware	88	5	93	10
District of Columbia	4	1	5	1
Maryland	297	20	317	40
West Virginia	65	11	76	2
Middle Atlantic	**1,799**	**217**	**2,016**	**84**
Virginia	685	111	796	92
North Carolina	1,367	387	1,754	243
South Carolina	640	251	891	158
Georgia	1,151	317	1,468	210
Florida	1,293	172	1,465	4
South Atlantic	**5,136**	**1,238**	**6,374**	**705**
Ohio	977	113	1,090	36
Indiana	917	256	1,173	91
Illinois	618	924	1,542	89
Michigan	648	86	734	85
Wisconsin	416	58	474	34
East North Central	**3,576**	**1,437**	**5,013**	**335**
Minnesota	389	153	542	99
Iowa	434	261	695	153
Missouri	531	402	933	177
North Dakota	39	92	131	24
South Dakota	13	27	40	5
Nebraska	43	259	302	70
Kansas	94	196	290	93
West North Central	**1,543**	**1,390**	**2,933**	**621**
Kentucky	477	107	584	52
Tennessee	464	128	592	78
Alabama	802	275	1,077	130
Mississippi	309	382	691	59
East South Central	**2,052**	**892**	**2,944**	**319**
Arkansas	163	190	353	62
Louisiana	160	130	290	13
Oklahoma	71	63	134	27
Texas	291	374	665	—2
West South Central	**685**	**757**	**1,442**	**100**
Montana	4	38	42	3
Idaho	13	110	123	15
Wyoming	2	14	16	3
Colorado	14	72	86	4
New Mexico	5	38	43	3
Arizona	28	165	193	—16
Utah	5	42	47	7
Nevada	2	4	6	—15
Mountain	**73**	**483**	**556**	**5**
Washington	47	195	242	—5
Oregon	33	168	201	8
California	335	[4]2,255	2,590	416
Pacific	**415**	**2,618**	**3,033**	**419**
Total	**15,655**	**9,105**	**24,760**	**2,600**
Hawaii	54	84	138	16
Puerto Rico	212	33	245	11
United States: 1958-59	**15,921**	[5]**9,222**	**25,143**	**2,627**
1957-58	**14,353**	[5]**8,163**	**22,516**	**0**
1956-57	**14,703**	[5]**8,006**	**22,709**	**193**

[1] Due to rounding, column or cross totals may not balance. [2] Includes: ground phosphate rock and colloidal phosphate, basic slag, secondary and trace nutrient materials, as borax, metallic salts, sulfur, gypsum, etc. used as separate materials. Does not include liming materials or the quantity of materials used in manufacture of commercial mixtures. [3] Less than 500 tons. [4] Includes an estimated 270,000 tons of dried manures. [5] Includes materials not guaranteed to contain N, P_2O_5, or K_2O, amounting to 1,214,000 tons in 1958-59, 939,728 tons in 1957-58, and 943,243 tons in 1956-57.

A substantial increase in the quantity of primary plant nutrients, as well as the quantity of fertilizer carriers consumed, over previous years was recorded in the United States during the year ended June 30, 1959. This relatively higher change in the pattern of consumption was related to the increased acreage of certain crops and State soil fertility programs.

The data are based on shipments of manufacturers, liquid nitrogen applicators, and State tonnage reports. Estimates of the nutrient contents are determined from average analyses of samples of products as reported by State fertilizer control officials. Data for Alaska and possessions of the United States were not available. Estimates from various sources indicate that their combined consumption is probably less than 8,000 tons which is not included in these totals.

Fertilizer

Consumption of fertilizer in the United States for the year ended June 30, 1959 increased substantially over the previous year (table 1). Total consumption was 25,143,000 tons —an increase of 2,627,000 tons (11.7 percent). It increased in all but seven States. In these, representing 1,827,000 tons or 7.3 percent of the total consumed in the United States, consumption was 49,000 tons below that of the previous year. Increases registered in the South Atlantic region were 705,000 tons (12.4 percent); in the West North Central region, 621,000 tons (26.9 percent), and in the Pacific region, 419,000 tons (16.0 percent). Substantially more fertilizer was also used in the East North Central and East South Central regions. More than one-half of the increase in consumption of fertilizer in the Pacific region was in the secondary and trace nutrient materials, principally gypsum. The total use of fertilizer in the South Atlantic and South Central regions which has steadily decreased since the peak consumption of 11,058,695

FROM SOHIO AT LIMA . . .

a line of Nitrogen products complete to the Nth degree

SOHIO CHEMICAL COMPANY

SOHIO'S complete line of nitrogen materials gives you the full-range flexibility you need in manufacturing high-analysis finished goods. Choose from a long list of Sohiogen® Solutions, anhydrous and aqua ammonia and Sohigro® Urea to meet your exacting requirements. The "Man from Sohio" will be glad to help you with formulations . . . and explain how you can benefit from Service at Sohio. Call him soon.

A complete line of Sohio nitrogen products for fertilizer manufacture

Ammonium Nitrate — Ammonia Solutions

Sohiogen 4424, Sohiogen 4122, Sohiogen 4526, Sohiogen 4730, Sohiogen 4126, Sohiogen 4934 — Old-line and concentrated solutions for both conventional and granulation use

Urea — Ammonia Solutions

Sohiogen 2104, Sohiogen 4531, Sohiogen 4537 — Urea and ammonia in 45% nitrogen solutions, winter and summer grades, and high urea content solutions for liquid fertilizer manufacture

Urea — Ammonium Nitrate — Ammonia Solutions

Sohiogen 4119, Sohiogen 4320, Sohiogen 4422, Sohiogen 4425, Sohiogen 4428, Sohiogen 4933 — Ammonium nitrate nitrogen solutions containing 6 to 15% urea to:
1. lower salting out temperatures of solutions
2. improve granulation
3. help condition mixed goods

Urea — Ammonium Nitrate Solutions

Sohiogen 2800, Sohiogen 3200 — 28 and 32% nitrogen solutions containing no free ammonia — ideal for surface and subsurface application — as materials and in complete liquid fertilizers

Anhydrous and Aqua Ammonia

Sohigro® Urea — your choice of 45% N coated or 46% N uncoated, prilled urea supplemental source of nitrogen

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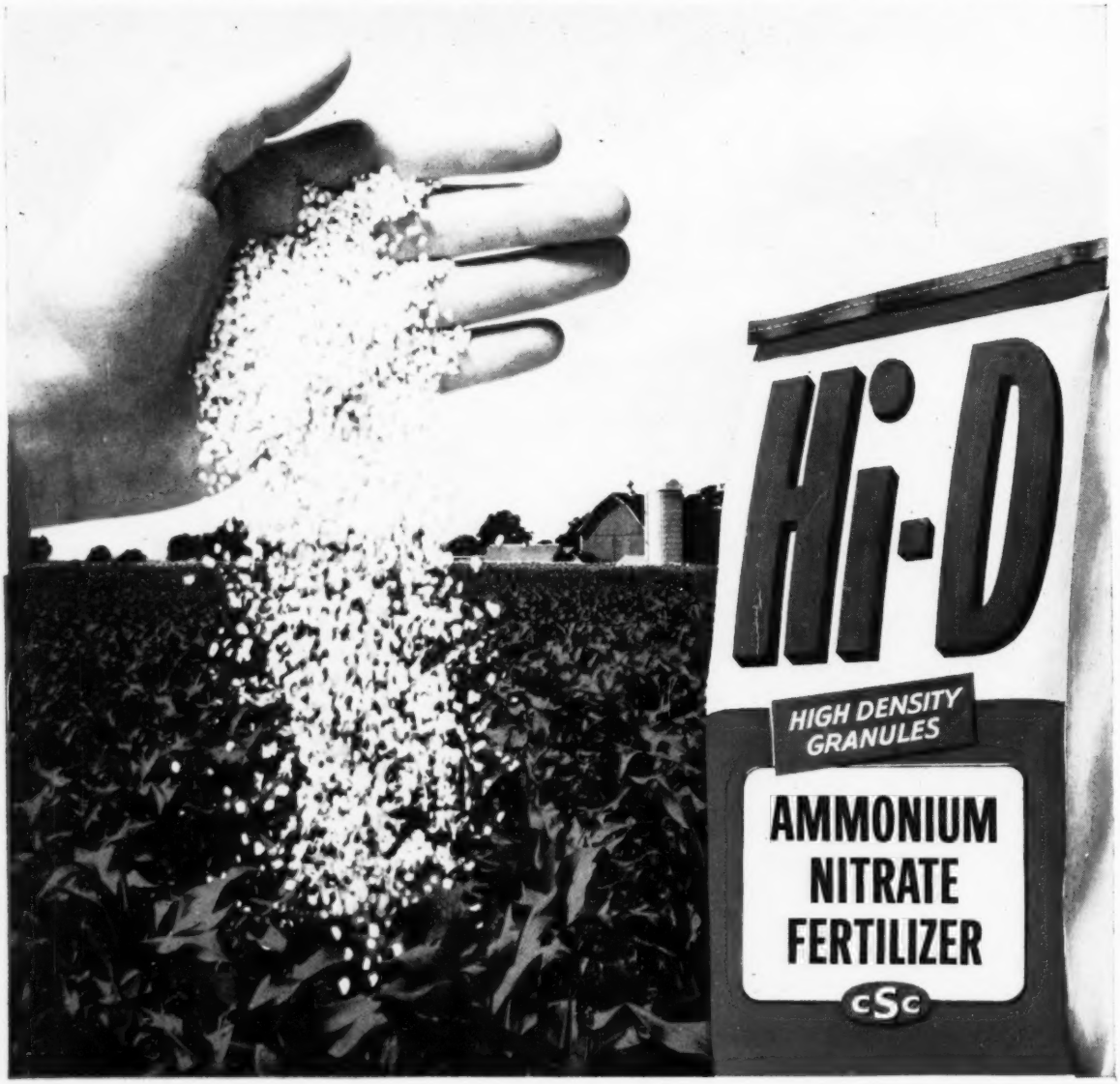
Phone CApitol 5-8015 or wire (TWX call letters LIMA O 497-U) 18-59

During the fertilizer season, advertisements like this in full color are appearing in Farm Journal, Farm & Ranch, Progressive Farmer, and Successful Farming.



Keeps crops on the grow

it's the ammonium nitrate that's granular!

Corn, cotton, wheat, pastureland – whatever your crop, Hi-D® is the nitrogen fertilizer to use. You'll find it better than any ammonium nitrate you ever used before.

Hi-D always flows freely! Hi-D's special granules are unusually high in density and super dry, have much less tendency to pick up moisture prior to application. You will find it most satisfactory out in the field, even under humid conditions. Hi-D doesn't gum-up, won't clog, cake or bridge in your spreader.

Hi-D has a guaranteed analysis of 33.5% nitrogen. Half of this is nitrate nitrogen for vigorous early growth. The other half is ammonia nitrogen for sustained follow-up feeding. Your crops get the two types of nitrogen they do best on!

Let Hi-D keep your crops on the grow. It's sound management. But remember, first test your soil, lime if necessary and follow with the mixed fertilizer your dealer recommends. Then add the supplementary boost of Hi-D. Ask your dealer for it by name. Hi-D—best in the land!

COMMERCIAL SOLVENTS CORPORATION, AGRICULTURAL CHEMICALS DEPARTMENT, 260 MADISON AVENUE, NEW YORK 16, NEW YORK
OFFICES IN ATLANTA, CHICAGO, CINCINNATI, CLEVELAND, DETROIT, KANSAS CITY, NEW ORLEANS, ST. LOUIS, STERLINGTON, LA.

Table 2.—Principal grades of mixtures consumed in United States, year ended June 30, 1959[1] (Preliminary)

Grade	Consumption	Grade	Consumption	Grade	Consumption	Grade	Consumption
	1,000 tons		1,000 tons		1,000 tons		1,000 tons
0-10-20	89	4-8-10	83	5-20-20	980	8-12-12	72
0-14-14	199	4-8-12	145	6-4-8	64	8-16-16	199
0-20-20	284	4-9-3	52	6-6-6	90	8-24-8	53
2-12-12	302	4-10-6	121	6-8-6	104	8-32-0	60
3-9-9	461	4-10-7	306	6-8-8	253	10-6-4	78
3-9-18	85	4-12-8	102	6-10-4	87	10-10-10	748
3-9-27	59	4-12-12	1,228	6-12-6	67	10-20-10	212
3-12-6	71	4-16-16	448	6-12-12	478	12-12-12	889
3-12-12	615	5-10-5	450	6-24-12	222	14-0-14	63
4-7-5	92	5-10-10	1,624	6-24-24	162	14-4-10	70
4-8-6	62	5-10-15	340	8-4-8	53	Other[2]	3,286
4-8-8	93	5-20-10	106	8-8-8	214	Total	15,921

[1] Grades consumed in amounts of 50,000 tons or more.
[2] Approximately 1,650 grades.

tons in 1951-52 consumed nearly that amount in this period.

Mixtures

Mixed fertilizers comprised 63.3 percent of the total tonnage of fertilizer consumed and amounted to 15,921,000 tons—an increase of 1,568,000 tons (10.9 percent). This is the first year since 1952-53 that mixtures have shown an increase and the total establishes a new peak in consumption. Regions in which the principal increases occurred followed closely those Regions having corresponding changes in consumption of all fertilizers.

There were 46 grades consumed in amounts of 50,000 tons or more, totaling 12,635,000 tons—accounting for nearly 80 percent of the tonnage of mixed fertilizers consumed and approximately 1,650 other grades accounting for the remaining 20 percent in 1958-59. The 46 grades are listed in table 2. While consumption of most of the 46 grades increased, six grades—4-12-12, 5-10-10, 5-10-15, 5-20-20, 6-12-12, 12-12-12—represented nearly 60 percent of the total increase in consumption of mixed fertilizers. These are the grades generally consumed in largest tonnages throughout the central and southeastern States.

Materials

The consumption of direct application materials amounted to 9,222,000 tons comprising 36.7 percent of all fertilizers consumed in the year ended June 30, 1959. Included in this tonnage are 7,996,000 tons of products containing one or more of the primary plant nutrients, 1,214,000 tons of products containing only secondary and trace nutrients, and 12,000 tons of products not classified (table 3). The consumption of materials containing primary nutrients increased 785,000 tons (10.9 percent) and secondary and trace nutrient materials 274,000 tons (29.2 percent) from the respective quantities in 1957-58. The change in consumption of direct application materials corresponded closely with the change in consumption of mixed fertilizers in most all of the Regions.

More than 73 percent of the increase in consumption of the primary nutrient materials was in the class of chemical nitrogen materials. Consumption of this class was 576,000 tons (14.8 percent) more than in 1957-58. Increases in the other classes of materials were 144,000 tons (6.0 percent) for phosphates, 40,000 tons (8.9 percent) for potash, and 13,000 tons (2.7 percent) for the natural organics.

Primary Plant Nutrients

During the year ended June 30, 1959, fertilizers used in the United States contained 7,396,000 tons of primary plant nutrients (N, available P_2O_5, K_2O) (table 4). This rep-

Table 3.—Kinds of fertilizers consumed, year ended June 30, 1959, by region, in 1,000 tons[1] (Preliminary)

Kind	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Hawaii Puerto Rico	Total Consumption	Change from year ended June 30, 1958
MIXTURES	**376**	**1,799**	**5,136**	**3,576**	**1,543**	**2,052**	**685**	**73**	**415**	**266**	**15,921**	**1,568**
CHEMICAL NITROGEN MATERIALS	**12**	**76**	**879**	**480**	**681**	**571**	**473**	**249**	**947**	**83**	**4,453**	**576**
Ammonia, anhydrous	0	3	29	80	170	61	146	45	140	1	676	93
Ammonia, aqua	[2]	[2]	0	7	1	[2]	7	25	359	49	448	83
Ammonium nitrate[3]	5	30	164	160	332	290	122	77	94	0	1,273	156
Ammonium nitrate-limestone mixtures	[2]	2	252	[2]	[2]	38	3	3	[2]	0	299	35
Ammonium sulfate	[2]	9	7	117	14	14	82	58	228	27	557	—20
Nitrogen solutions	1	6	151	93	158	15	25	10	60	0	518	194
Sodium nitrate	2	11	250	1	[2]	145	57	[2]	[2]	[2]	467	31
Urea	2	5	3	17	5	1	23	18	28	6	107	9
Other[4]	1	10	23	5	1	7	9	13	38	[2]	108	—5
NATURAL ORGANIC MATERIALS	**27**	**40**	**32**	**46**	**17**	**2**	**7**	**7**	**329**	**[2]**	**507**	**13**
Dried manures	9	13	6	6	4	1	3	2	272	[2]	316	15
Sewage sludge, all	6	17	9	29	7	1	2	4	49	[2]	124	—10
Tankage, all	3	8	6	1	[2]	[2]	0	[2]	1	[2]	19	1
Other[4]	9	2	11	10	6	[2]	2	1	7	0	48	7
PHOSPHATE MATERIALS	**32**	**86**	**126**	**698**	**630**	**251**	**234**	**196**	**278**	**17**	**2,548**	**144**
Ammonium phosphate[5]	[2]	1	1	21	183	3	106	86	144	2	547	78
Basic slag	0	0	21	0	0	117	2	0	0	0	140	—5
Calcium metaphosphate	0	1	3	6	23	16	[2]	[2]	[2]	0	49	3
Phosphate rock & colloidal phosphate	[2]	7	18	529	238	17	20	[2]	2	4	835	—17
Superphosphate: 22% and under	29	71	76	50	46	87	61	16	89	5	531	53
Superphosphate: Over 22%	[2]	2	5	90	140	11	42	86	28	4	408	34
Other[4]	2	4	3	2	[2]	[2]	3	8	15	[2]	39	—2
POTASH MATERIALS	**3**	**9**	**85**	**207**	**52**	**64**	**39**	**3**	**14**	**13**	**488**	**40**
Potassium chloride	2	7	40	203	51	48	37	2	7	11	407	42
Other[4]	1	2	45	4	1	16	2	1	7	2	81	—2
PRIMARY NUTRIENT FERTILIZERS	**449**	**2,009**	**6,258**	**5,007**	**2,923**	**2,940**	**1,439**	**528**	**1,983**	**380**	**23,917**	**2,353**
SECONDARY & TRACE NUTRIENT MATERIALS	**[2]**	**4**	**116**	**4**	**3**	**4**	**3**	**28**	**1,050**	**3**	**1,214**	**274**
Gypsum	[2]	3	114	1	[2]	3	[2]	22	1,005	0	1,148	259
Other[4]	[2]	1	2	3	2	1	3	6	45	3	66	15
NOT CLASSIFIED	**0**	**3**	**0**	**2**	**7**	**0**	**0**	**0**	**0**	**0**	**12**	—
ALL FERTILIZERS	**449**	**2,016**	**6,374**	**5,013**	**2,933**	**2,944**	**1,442**	**556**	**3,033**	**383**	**25,143**	**2,627**

[1] States comprising the regions are ilsted in table 1. Due to rounding, totals of items may not add to column or class totals. [2] Less than 500 tons. [3] Undetermined quantities may have been used for non-fertilizer purposes. [4] Includes quantities undesignated by kind. [5] Includes all reported quantities of grades: 11-48, 11-50, 13-19, 16-20, 20-52, 21-53, and 27-14.

Table 4.—Primary plant nutrients consumed in regions and United States as mixtures and as direct-application materials, by kinds, year ended June 30, 1959, in 1,000 tons[1] (Preliminary)

Kind	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Hawaii & Puerto Rico	United States
						Nitrogen					
MIXTURES	**29**	**105**	**251**	**228**	**129**	**101**	**56**	**10**	**45**	**33**	**987**
MATERIALS	**5**	**26**	**220**	**190**	**343**	**189**	**226**	**108**	**329**	**20**	**1,656**
Ammonia, anhydrous	0	3	24	66	140	50	120	37	115	1	555
Ammonia, aqua	[2]		0	2			1	5	71	10	90
Ammonium nitrate	2	10	55	54	112	98	41	26	32	0	430
Ammonium nitrate-limestone mixtures			52			8	1	1		0	62
Ammonium sulfate		2	2	24	3	3	17	12	48	6	117
Calcium cyanamide		2	2			2	2		2	0	9
Natural organics	1	2	2	2	1				6		14
Nitrogen solutions		2	38	31	57	4	8	3	14	0	157
Phosphate products				3	27	1	16	14	24	1	85
Potassium products			2						0		2
Sodium nitrate		2	40			23	9				75
Urea	1	2	1	8	2	1	10	8	13	3	49
Other chemical nitrogen products		1	2	1				2	5		1
Total nitrogen	**34**	**131**	**471**	**418**	**472**	**290**	**282**	**118**	**374**	**53**	**2,643**
						Available P_2O_5					
MIXTURES	**44**	**214**	**481**	**580**	**292**	**233**	**111**	**13**	**47**	**16**	**2,031**
MATERIALS	**7**	**18**	**23**	**84**	**155**	**45**	**61**	**72**	**76**	**4**	**545**
Ammonium phosphates		1		10	60	1	27	25	35	2	160
Basic slag	0	0	2	0	0	10		0	0	0	12
Calcium metaphosphate	0		2	4	14	10				0	30
Natural organics	1	1	1	1	1				6		11
Phosphate rock and colloidal phosphate[3]			1	16	7		1				25
Superphosphate: 22% and under	6	15	15	10	9	17	13	3	17	1	105
Superphosphate: over 22%		1	3	42	65	5	19	39	12	2	187
Other phosphate products	1	1	1				1	5	6		16
Total available P_2O_5	**51**	**232**	**504**	**664**	**447**	**278**	**172**	**85**	**123**	**20**	**2,576**
						K_2O					
MIXTURES	**45**	**196**	**554**	**546**	**194**	**227**	**73**	**3**	**30**	**33**	**1,902**
MATERIALS	**2**	**5**	**31**	**126**	**31**	**33**	**23**	**2**	**15**	**7**	**275**
Natural organics				1					8		10
Potassium chloride	1	4	24	124	31	29	22	1	4	7	247
Other potassium products		1	7	1		4	1		3	1	19
Total K_2O	**48**	**201**	**585**	**672**	**225**	**260**	**96**	**5**	**45**	**40**	**2,177**
GRAND TOTAL: N, avail. P_2O_5, K_2O											
1958-59	**133**	**564**	**1,560**	**1,754**	**1,144**	**828**	**550**	**208**	**542**	**113**	**7,396**
1957-58	**129**	**539**	**1,366**	**1,569**	**886**	**726**	**497**	**196**	**501**	**103**	**6,312**
1956-57	**125**	**536**	**1,386**	**1,495**	**819**	**786**	**477**	**163**	**452**	**138**	**6,377**

[1] States comprising the regions are listed in table 1. Due to rounding, totals of items may not add to column or class totals.
[2] Dashes ( ) represent quantities less than 500 tons.
[3] Represents 2 percent of the colloidal phosphate and 3 percent of the phosphate rock.

resented a substantial increase in primary nutrients (884,000 tons, 13.6 percent) from that consumed in the preceding year. Consumption of nitrogen was 2,643,000 tons, an increase of 359,000 tons (15.7 percent); that of available P_2O_5, 2,576,000 tons —283,000 tons (12.3 percent) more; and that of K_2O, 2,177,000 tons—242,000 tons (12.5 percent) above their amounts in 1957-58. Consumption of these nutrients increased substantially over any previous year and reflects the removal of acreage allotments as well as soil fertility programs.

Primary nutrients in mixed fertilizers represented: 37.3 percent of the nitrogen, 78.8 percent of the available P_2O_5, and 87.4 percent of the K_2O. Mixed fertilizers were accountable for 36.8, 82.3, and 90.1 percent of the increases in consumption of these nutrients, respectively. The larger use of the six grades previously listed supplied approximately one-half of the increase in tonnages of these nutrients.

The weighted average of primary nutrients contained in mixed fertilizers continued its upward trend. These averages were for nitrogen, 6.20 percent; for available P_2O_5, 12.76 percent; for K_2O, 11.94 percent; and for the total of these nutrients, 30.90 percent. The corresponding values in the preceding year were 5.96, 12.53, 11.73, and 30.22 percent.

Materials consumed for direct application represented: 62.7 percent of the nitrogen, 21.2 percent of the available P_2O_5, and 12.6 percent of the K_2O. Increases in consumption of these nutrients accountable to materials were, respectively: 63.2, 17.7, and 9.9 percent. The combined increase in consumption of anhydrous ammonia, nitrogen solutions, and ammonium nitrate represented more than 80 percent of the increase in nitrogen consumed as direct application materials. In the phosphate materials, the increase in consumption of the ammonium phosphates and superphosphates accounted for practically all of the increase in available P_2O_5, and that of K_2O in the increase in use of potassium chloride.

Increases in primary nutrients accountable to both classes of fertilizers (mixtures and materials) were proportionate to their respective contents reflecting a general increase in consumption of all primary nutrients. The proportionate increase in consumption of primary nutrients in 1959 compared with 1958 was highest in those areas in which increases in planted acreage of cotton and corn was highest (West North Central) and lowest in those areas in which there was little change in planted acreage (New England).

V-C Stock Offered To Employees

Virginia-Carolina Chemical has instituted a new internal stock purchase plan under which the company will give employees one share of common stock for every two they buy themselves.

Under the plan, which went into effect January 1, the company will contribute $1 for every $2 invested by an employee, and will guarantee the employee against loss for two years after the stock is purchased.

Secretary R. Clifton Long said the plan is designed "to encourage employees to share in the ownership of the company and to strengthen employees' financial security."

All of V-C's 3400 employees who have been with the company 18 months or longer are eligible to participate.

Arcadian® News

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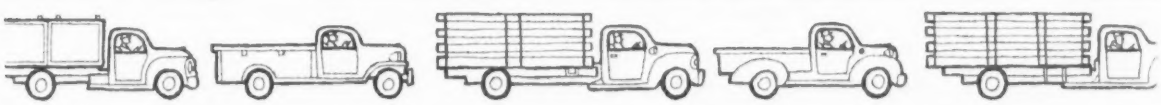


ARE YOU READY FOR THE SPRING RUSH?

The spring rush is just ahead! Every indication points to another big fertilizer year, with your sales dependent on how fast you can get the tonnage out. Right now is the time to take steps to make sure that your plant and operation is in shape to keep mixed goods moving. Plan, schedule and repair now to avoid slow-downs, break-downs and stoppages later.

To do the best job of preparing for the spring season, concentrate on three areas: *your dealers and their customers, your inventory,* and *your production.*

Urge Early Delivery

Do your best to convince dealers and farmers to stock up in advance of actual need. Point out that it's better to have fertilizer stored in the barn or warehouse when needed than to be at the mercy of rush season deliveries. Dealers should encourage farmers to determine and order their various analyses as far in advance as possible. By the same token, you, yourself, should order raw materials so that they are on hand *before* you need them. This will assure your having the right supplies—especially those materials that might become short during the spring season.

Make it a point to urge dealers to put in bulk handling equipment, and suggest that they have a fast means of loading customer's orders during the inevitable rush period. Make a dealer survey to determine what grades and amounts will be needed. Try to get some idea of how much will be in bags, how much in bulk.

Boost Your Inventory

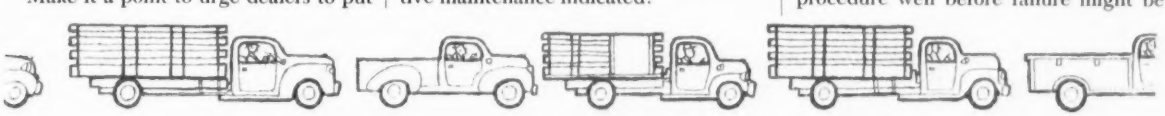
Fill your inventory to capacity. As insurance, take additional warehousing facilities in areas of heaviest springtime demand. When the rush is on, some misguided manufacturers run their plants at night and bag and ship during the day. This can result in delivering a product that is not well-cured. So, get as much storage as possible for your bagged fertilizer.

Eliminate Shut-Downs

Of course, all the planning and scheduling on behalf of inventories, product demands and storage, raw materials, etc., are to no avail when production falters and stalls during the spring rush. But, fortunately, by taking precautions now, costly breakdowns and tonnage-cutting slow-downs can be avoided. Look for these key "troubles"...apply the preventive maintenance indicated:

Frozen air lines—Air compressors deposit a lot of water during steady operations, and if this water freezes, it could plug or crack air lines, or damage the compressor itself. Some plants have lost a whole day correcting frozen airlines. ***How to prevent:*** Drain air lines frequently. Avoid low pockets when installing lines. Observe the precautions against applying heat to nitrogen solution equipment.

Valve diaphragm failure—Leaking inlet valves can cause bad working conditions, foul the mixer, and contribute to poor condition of the fertilizer. There have been some baffling and costly cases of low analysis where the valve ahead of the measuring tank leaked only during the time solution was being forced into the mixer. Pressure was strong enough to return some of the solution to the railroad car, and it was impossible to see this happening. ***How to prevent:*** An inlet valve leak can be discovered by watching for any change in the liquid level of the measuring tank while the tank has its maximum operating pressure with no solution valve open. Valve diaphragms should be replaced as routine procedure well before failure might be



expected. This preventive maintenance is well worth the small cost involved.

Clogged gauge glasses—Restricted flow in gauge glasses causes almost all of the faulty proportioning that occurs as materials flow through measuring tanks. ***How to prevent:*** Keep *all* gauge glass connections free and open by removing the plugs and cleaning the passages with a wire brush and water. Any "creeping" of the level in a gauge glass after the valves are closed indicates clogging and should be the signal for immediate cleaning. Also, producers should see to it that gauge glasses are protected from accidental breakage, and that spare glasses are kept on hand.

Leakage to and from batch mixers—A long list of troubles stem from leakage of materials into or out of batch mixers. These troubles include: excess fumes, faulty analysis, and even fires where substantial quantities of sulphuric acid and nitrogen were used. ***How to prevent:*** Check mixer inlet and outlet doors regularly for leakage and wear of operating mechanism.

Fouled rotary mixer—It's quite common for the rotary mixer to get so fouled between the flights that it neither mixes nor discharges on schedule. Under such conditions, proper ammoniation becomes impossible. Many factors contribute to this fouling, especially these three:

1. **Adding nitrogen solution or acid to the mixer when only superphosphate is present.** Even if distributor pipes were correctly drilled to accommodate the unusual density pattern in the mixer under these conditions, the mass would still be excessively sticky from heat and probably moisture—especially where damp superphosphate and nitrogen solutions with relatively high moisture content are used. ***How to prevent:*** Have *all* of the dry ingredients in the mixer before adding nitrogen solution or acid.
2. **Adding nitrogen solution to the dry ingredients as they enter the mixer.** This not only fouls the mixer, but also contributes to poor working conditions, and lowers the quality of the fertilizer. ***How to prevent:*** As above, put all the ingredients into the mixer *first*—then add the liquids.
3. **Solution or acid leakage into an empty batch mixer.** Such leaks prepare the surfaces of the mixer for rapid build-up and quick corrosion. The trouble may be in leaking valves, or in long runs of piping from the measuring tank or meter to the mixer. ***How to prevent:*** Fix leaking valves. Install an air purge in a long run of pipe to make sure that all the solution enters the mixer during the mixing cycle.

Mis-use of withholding hopper—Where producers foolishly leave the gate of the withholding hopper open at all times, allowing materials to flow directly into the mixer, trouble is inevitable. Among the problems this can cause are: Faulty analysis, poor condition, and excessive fumes. ***How to prevent:*** Use the hopper as it was intended to be used.

Failure to rehandle—Although rehandling of pulverized goods to improve physical condition is generally practiced, a few producers try to eliminate this step in the spring. It usually turns out to be a costly shortcut. ***How to prevent:*** *Always* rehandle pulverized goods.

Common granulation troubles—Producers who turn out granulated goods usually run into these problems: failure to get granulation started, drop-off of granulation after it has started, fouling of the mixer and dryer, overloading of the hammer mill, blinding of screens, excess of moisture and heat in the stored product. Also, fires in the mixer continue to cause delays, as well as jeopardize safety. ***Some preventive measures:*** Many operators shorten start-up time by warming the equipment as far ahead of start-up time as practical, and by starting with about the same amount of recycle that experience has shown to be normal . . . Regulated recycle aids smooth operation about as much as any one factor in granulation . . . By starting a little on the dry side and gradually building up to the desired liquid phase, the prospects of fouling equipment early in the day will be greatly minimized.

Premature granulation in the ammoniator—If it is continuous, premature granulation can contribute its share of production slow-downs. Some of the causes are excessive use of sulphuric acid, combined with high ammoniation rates—especially with the "wetter" acids and nitrogen solutions. Of course, in some cases, this may be deliberate, to obtain the heat that promotes granulation. ***How to prevent:*** Two of the best ways to curb premature granulation is to use materials with low moisture content and provide for uniform recycle.

Excessive use of acid—Faulty ammoniation equipment or techniques will lead to use of overly large quantities of acid to take up the ammonia that is not reacted with the superphosphates. ***How to prevent:*** Make daily inspections of all liquid distributing equipment.

Inadequate dryer operation—Where

Scrubbing Assures Clean Cars for You

Washing and inspection of Nitrogen Division tank cars before reloading with Nitrogen Solutions for delivery to you is a standard part of Nitrogen Division service. Here a string of tank cars enters the wash rack station.

rotary dryers do not perform as well as they should, excess acid in some units is expected to do much of the work of the dryer in granulation and drying. This is particularly true with a counter-current dryer that is inadequate. Here there is too little hot air being forced through the length of the dryer. This usually happens because an enormous amount of air leakage at the fertilizer inlet end causes air to leak directly to the suction fan, thus by-passing the burner end of the dryer. Failure to correct this leads to excess moisture in the stored goods—with all the troubles that this condition can impart to fertilizer. ***How to prevent:*** Eliminate air leakage. Also, check fan blades, air ducts and dust collectors for build-up that restricts air flow.

Excess fines—Damp fertilizer quickly blinds the screen, which results in too great a quantity of fines delivered to the pile. This will influence the amount of recycle in many systems. ***How to prevent:*** Check your fines screen—it may be too fine for the grade you are producing. Also, check your procedure to see if you can produce less fines.

Semi-granulation troubles—Producers sometimes find that their semi-granulated goods do not hold up as well as expected. This could be the result of inability to hold the moisture content to a trouble-free level at all times. Also, shut-downs in semi-granulations may be caused by failure to get desired granulation . . . or by fouling of equipment, particularly the mixer, and, at times, the bucket elevators. Operating conditions are frequently near the point where fouling is an ever-present threat, and some adjustment may be necessary to compensate for the variables found in materials, plant temperatures, weather, etc. Since semi-granulation production *is* so sensitive to so many variables, operators must be very alert and adhere strictly to correct operating procedures. If they prove careless, there is a real danger of fires breaking out in the mixer. ***How to prevent:*** Every effort should be made to permit discharging the mass as early and as quickly as conditions demand.

Ask Nitrogen Division

Your Nitrogen Division technical service man is familiar with methods and materials that speed production of good-quality mixed fertilizers. Getting his advice and assistance now may help you to mix and ship more tonnage during your peak period. This service is available to customers without charge. Simply contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N.Y.

HOW WE PROMOTE YOUR PRODUCTS

This year, as every year, Nitrogen Division is stressing the importance of a balanced fertilizer program in crop production. The typical page advertisement shown here, which appears in leading farm magazines, shows how the ARCADIAN® Ammonium Nitrate campaign features the teamwork of mixed fertilizers and nitrogen top-dressing or side-dressing.

This consistent policy of emphasizing the need for mixed fertilizers makes this Allied Chemical campaign the "perfect partner" for your own promotion and sales program. Here's what the lead-off copy in this page advertisement says:

"Team these Two for Big Yields"

"To make vigorous, healthy growth and produce abundant yields, all crops require a balanced fertilizer program. Mixed fertilizers are the most efficient way to supply the plant food needs of your crops. . . . For the most profitable yields, use plenty of mixed fertilizer, and when your crops need extra nitrogen, use genuine ARCADIAN Ammonium Nitrate."

The balance of the sales message also sells mixed fertilizer in statements such as these:

"Plowed down and in the row, mixed fertilizers save time and labor in feeding your crops several needed plant foods in one application."

"ARCADIAN Ammonium Nitrate works in perfect partnership with mixed fertilizers to make your crops produce bigger yields and profits."

"Make sure you use plenty of mixed fertilizers and when you need extra nitrogen, always buy ARCADIAN!"

Yes, Nitrogen Division, Allied Chemical, is constantly featuring your mixed fertilizers in its own advertisements to your customers, the farmers. This is only one of many valuable services Nitrogen Division provides. Call Nitrogen Division when you need nitrogen materials and service.

HERE'S THE BIG LINE OF Arcadian® NITROGEN SOLUTIONS

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
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10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
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FERTILIZER USE BY NON-FARM HOMES IN NEW ENGLAND

by Arnon L. Mehring

This is the first of a series of regional studies of the non-farm fertilizer market conducted by the author, and appears in the current issue of Plant Food Review. *It supplements the nation-wide study made by the author in 1956 and which was reported in the Fall 1957 issue of National Plant Food Institute's* Plant Food Review.

Non-farm private households in New England used about 53,700 tons of commercial fertilizer on lawns, gardens and house plants during the year ending June 30, 1959. The mean consumption per household in the region during the same period was probably around 41.5 pounds.

Of this total, over half (57.1 percent) was used on lawns. Vegetable gardens accounted for slightly more than one quarter (26.7 percent). The remainder was used on flowers, shrubbery, trees and house plants (See Table 1).

Table 1—Estimated Total New England Non-Farm Home Fertilizer Consumption by Type Vegetation, Year Ended June 30, 1959

Vegetation	Percent of Total Reported	Estimated Tonnage
Lawns	57.1	30,700
Flowers	11.4	6,100
Vegetables	26.7	14,300
House Plants	0.3	200
Shrubbery	2.7	1,400
Trees	1.8	1,000
Total	100.0	53,700

These data were developed as the result of a sample survey conducted during the summer of 1959 in 130 cities and towns scattered all over the six New England States. It was the first of a series of regional studies being conducted by the author to supplement and refine a previous study of "Characteristics of The Non-Farm Fertilizer Market," results of which were published in the Fall 1957 issue of Plant Food Review. Results of the other regional studies will be published as rapidly as they become available.

Accompanying this article is a discussion of how the study was conducted. This discussion of methodology will not be repeated in connection with future articles.

The previous study had indicated that about 64,000 tons of fertilizer had been used for all non-farm purposes during 1954. This was a calculated figure based on the 1954 Census of Agriculture and U. S. Department of Agriculture estimate of consumption for all purposes.

A sample survey, conducted in 1956, indicated that average consumption per private household in New England was around 45 pounds. This would have meant that total consumption by non-farm private households in the six-State area that year was about 58,500 tons.

However, these results were based largely on a practically complete survey of a single community — Winsted, Conn. — and a sample drawn from New Haven, Torrington, and Guilford, Conn., and a number of other smaller communities in Massachusetts and Connecticut, which together were thought to be representative of the whole New England region. The results of the present sample survey are considered to be more representative of the actual situation, because they have made it possible to more accurately reflect and analyze the various factors affecting consumption. Nevertheless, it should be noted that the 45-pound-per-household average from the earlier study is within the range of the calculated standard error (37.9 to 45.1) determined from the new study.

It is likely that the total consumption of fertilizer in the region during 1958-59—both farm and nonfarm—was about 450,000 tons. This would mean that lawns, gardens and house plants accounted for about 12 percent of the total.

Table 3 shows a breakdown of consumption by type of fertilizer. Of the mixed fertilizers, the most popular grade by far turned out to be 5-10-10, which accounted for nearly one-fourth of the total home consumption.

Table 2—Frequency Distributions of Amounts of Fertilizer Reported Used per Home in the places shown[1]

Pounds of Fertilizer	Number of Times Reported		
	Boston	Metropolitan fringe[2]	New England
0	32	16	312
0.1—0.5	1	1	22
1—2	5	1	17
3—10	2	3	44
11—20	3	1	20
22—30	—	—	12
32—40	—	—	13
45—50	1	2	26
51—60	1	—	12
70	—	—	5
74—80	—	2	42
90—100	—	3	18
101—150	—	—	7
152—200	—	4	32
240—300	—	3	18
320—400	—	1	8
405	—	—	1
560—600	—	1	3
630—640	—	1	3
880	—	—	1
Total	45	39	616

[1] The distribution intervals are shown as the minima, maxima, or means actually reported.
[2] Unincorporated parts of metropolitan areas.

Arnon L. Mehring *presently is a private fertilizer consultant. He formerly was Senior Chemist and later Fertilizer Staff Specialist with the U. S. Department of Agriculture in charge of fertilizer statistics.*

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Table 3—Estimated Fertilizer Consumption on Lawns, Gardens, and House Plants of Non-Farm Homes, by Kind and Grade, Year Ended June 30, 1959

Kind and Grade	Homes in survey using it	Quantity reported in survey	Equivalent Total for the region
Mixed Fertilizers	**Number**	**Pounds**	**Tons**
4-8-8	2	51	100
5-8-7	7	1,610	3,300
5-10-5	23	1,598	3,260
5-10-6	4	650	1,300
5-10-10	34	6,076	12,400
6-10-4	43	2,032	4,150
7-7-7	8	1,018	2,100
8-6-2	7	640	1,300
8-6-4	4	425	900
8-16-16	7	610	1,200
9-7-4	17	1,130	2,300
10-5-5	11	1,210	2,500
10-6-4	9	1,517	3,100
10-10-10	6	1,405	2,900
10-20-10	2	160	300
16-4-4	4	770	1,600
Miscellaneous	21	1,302	2,660
Small Packages			
For roses	4	42.2	80
For acid-loving plants	3	20.0	40
For house plants	83	64.5	130
Lawn Service	5	171.8	350
Materials			
Ammonium nitrate	2	112	200
Sodium nitrate	2	145	300
Urea	2	51	100
Dried cow manure	18	1,110	2,270
Dried sheep manure	7	157	320
Other dried manure	3	62	120
Activated slude	13	1,056	2,200
Process tankage	5	662	1,300
Bone meal	11	342	700
Superphosphate	2	110	200
Wood ashes	1	10	20
Total	**370**	**26,319.5**	**53,700**

Of the total, only about one-eighth was of organic origin — primarily dried animal manure, activated sewage sludge and process tankage. Straight materials, such as ammonium nitrate, sodium nitrate, urea and superphosphate, accounted for less than two percent of the total.

Nearly one-fifth of all families interviewed had used more than one kind of fertilizer during the year. It was also found that much of the specialty fertilizer applied to shrubbery was of acid reaction.

Before this survey was made, it was assumed that all cities in a region of about the same size would have approximately the same mean rate of consumption per home. As the sampling proceeded, however, it became apparent that this assumption was not uniformly correct. The original plan was to have only one or two cities of each size group represented in the sample by a number of homes equivalent to its proportion of the total population. This plan was subsequently changed to include as many localities as possible — even though this meant a smaller sample in each locality—and to attempt to include the different types of localities in about the proper ratio.

Table 4 summarizes the number of urban communities in New England in each size group, and the number represented in the sample. The table also shows the highest consumption reported by a single household in each community size group, and the mean consumption per home in each size group with its standard error.

This summary of the effect of community size on consumption presents a somewhat different picture than the earlier study for the United States as a whole. In New England, the mean seems to increase from around 4 pounds per home in Boston to around 80 pounds per home in the smaller communities.

In New England, the more-or-less continuous decrease from the smaller to the larger communities is interrupted in the 25,000 to 50,000 size class. A larger sample might have given a more continuous progression. However, there is good evidence for believing that this deviation in the 25,000 to 50,000 size group is real.

Of the 26 incorporated cities with 25,000 to 50,000 population in New England, seven are a part of the Boston metropolitan area, and one is a part of the Providence metropolitan area. Also included in the Boston area are four unincorporated urban communities in this size group, while the Providence area also includes one such community.

Most of these communities in the Boston and Providence areas consist principally of detached homes. A relatively larger proportion of the New England cities with less than 25,000 inhabitants are independent communities with all classes of dwellings — apartmen. and row houses as well as detached homes. Thus, it seems reasonable to assume that mean consumption in the 25,000 to 50,000 class should be larger than for the next two smaller classes.

As a matter of fact, the data from the survey seem to show that consumption of fertilizer by private households is closely related to the number of detached homes in the community. Table 5 compares the mean consumption per home with the percentage of occupied detached dwelling units in the 12 largest New England cities.

Unfortunately, when the survey was being made, the author had no idea that the statistics would be used to make this comparison. As a result, only a few homes are represented in four of the 12 cities, and no sampling was done in two others. Therefore, the data for certain cities with approximately the same percentages of detached homes have been grouped. Estimates for Fall River and New Bedford, which were not sampled, were obtained by plotting a smooth curve with the results from the communities that were sampled, and introducing the percentages for these two communities into the curve.

When the estimated means for Fall River and New Bedford are averaged with data from cities in the 100-250 thousand class that were sampled (Table 4), the overall mean for cities in this class is reduced from 18.7 to 17.6. Although 17.6 probably is closer to the real mean

Table 4—Results of Sample Survey on Fertilizer Consumption, by Size of Community

Population in thousands	Communities: New England (Total)	Communities: Sample	Proportion in sample	Total non-farm population	Fertilizer consumption: Maximum per home	Fertilizer consumption: Mean and its Standard error
	Number	Number	Percent of total	Percent of total	Pounds	Pounds
500-1,000	1	1	7.3	9.0	60	4.0(+—) 1.8
100-250	11	9	16.4	18.7	320	18.7(+—) 4.8
50-100	17	12	8.6	13.9	600	27.9(+—)12.1
25-50	26	18	13.3	10.9	640	51.2(+—)11.2
10-25	44	15	15.0	8.1	630	40.5(+—) 9.5
5-10	43	20	19.8	3.4	320	43.8(+—) 8.6
2.5-5	81	15	5.0	3.2	560	76.1(+—)16.0
1-2.5	231	14	4.1	4.0	390	87.5(+—)21.1
Less than 1	40	15	4.2	16.2	880	62.1(+—)16.1
Unincorporated metropolitan fringe		12	6.3	12.6	630	89.3(+—)21.6
Total	**494**	**130**	**100.0**	**100.0**	**880**	**42.7(+—) 3.6**

tor cities in this group, the difference is not significant.

When the data are classified according to occupational groups, it is found that management personnel use the largest quantities whereas domestics use the least (See Table 6). Professional workers and skilled craftsmen also use relatively large quantities. Smaller quantities are used by laboring classes and clerical workers.

The breakdown by occupation seems to follow a logical pattern. Although not shown specifically by the data, amount of income or financial status seems to be a dominant factor. Persons in the management and professional categories, for instance, would be expected to have relatively higher incomes and therefore be more likely to occupy detached dwellings in the suburbs with extensive grounds. Clerical workers could be an exception, but it is presumed that a larger proportion of them are single persons who live in apartments or rented rooms.

Education and cultural background are other factors that probably affect the pattern by occupational groups. However, these factors have not been evaluated.

The "all other" group in the table is far from homogeneous with widows and retired people as a group using far more fertilizer than students and unemployed persons. However, the sample in each category is not sufficiently large to show reliable differences between the categories.

The mean obtained for laborers is thought to be somewhat too high, but is reported as it was obtained. It seems likely that if another sample of the same size were taken, some of the groups in the middle of the table might change their relative standings.

The study indicates that consumption per home by white people is much greater than for non-whites (43.3(+—)3.5 pounds as compared with 7.74(+—)4.9 pounds). However, the sample contained only 9 Negro homes and one oriental home. Although, as compared with the total sample, these samples represent the exact proportion of the two races in the New England population, they are considered too small to be reliable indicators.

The largest percentage of non-users of fertilizer was found in Boston (71 percent). In the 100-250 thousand class, 59 percent used no fertilizer, and 60 percent in the 50-100 thousand classes were non-users.

Table 5—Comparison Between Proportion of Detached Dwellings and Fertilizer Consumption in 12 Largest New England Cities

Cities	Occupied detached dwel.ing units[1]	Homes represented in sample	Mean per Home
	Percent	Number	Pounds
Hartford, Cambridge and Somerville	10.1	18	4.7
Boston	10.5	45	4.0
Fall River	14.5	0	15.0[2]
Providence, New Haven and Bridgeport	18.2	69	20.8
New Bedford	21.1	0	23.0[2]
Worcester, Waterbury and Springfield	27.0	14	26.3

[1] Computed from data given in Table 22, 1950 U. S. Census of Housing, General Summary.
[2] Estimated. See Text.

Percentage of non-users thereafter decreases in the order of decreasing population to a minimum of 40 percent for villages and the open country. For the region as a whole, about half of the non-farm households used no fertilizer.

Many of the non-users that were interviewed expressed an interest in fertilizer. People with poor looking lawns and scraggly plants often admitted that they should use fertilizer, but said they were afraid to do so. They told about friends who had experienced poor results or had "burned" holes in their lawns with fertilizer. Whether these replies were always real, or were purely defensive, they indicate that many urban dwellers fail to use fertilizer out of lack of knowledge as to how to use it properly. Moreover, many others get poor results—or actually damage lawns and plants—for the same reason.

Most city people have little knowledge of the composition of fertilizer, plant food ratios, or the proper ratios to use for various purpoes. They usually depend on the local hardware or garden supply dealer to sell them the kind of fertilizer they need and to tell them how much to use. This, all too often, produces disappointing results.

Table 2 shows a distribution by amounts used of the 616 homes that were sampled. It was found that in the suburbs of the large cities, about half of the homes surveyed had consumed 20 pounds or more of commercial fertilizer. For New England as a whole, however, only 6.3 percent had used as much as 20 pounds.

The average consumption by households using fertilizer was found to be 81 pounds. This is 10 pounds greater than indicated by the 1956 study.

The most frequently stated amounts by fertilizer users were multiples of 10 pounds and of 80 pounds. The reason for this is that the 80-pound bag is standard for most brands and is available in practically all seed, garden supply and hardware stores. In many other types of stores, however, it was found that the 10-pound bag or package is the largest available.

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Table 6—Mean Fertilizer Consumption, Non-Farm New England Homes, by Occupation

Occupational Group[1]	Proportion in Sample		Proportion in total non-farm work force[2]	Mean per home and its standard error
	Number	Percent	Percent	Pounds
Management	69	11.2	8.4	99.0(+—)20.5
Professional	72	11.7	9.3	48.0(+—) 8.8
Skilled craftsman	120	19.4	14.6	44.6(+—) 8.9
Salesman	55	9.0	6.9	39.1(+—) 9.2
Laborer, except farm[3]	28	4.5	5.1	36.1(+—)15.6
Public Service[4]	56	9.1	7.1	28.0(+—) 9.0
Operative[5]	78	12.7	25.6	27.5(+—) 7.0
Clerical	77	12.5	12.9	21.5(+—) 4.8
House workers	10	1.6	1.8	1.3(+—) 0.6
All Others[6]	41	6.7	7.3	34.0(+—)11.2
Occupation unknown[7]	10	1.6	1.0	73.6(+—)24.9
Total	**616**	**100.0**	**100.0**	**42.7(+—) 3.6**

[1] The grouping in the sample is the same as in the census, as far as known, except for "All Others."
[2] U.S. Census of Population 1950, Vol. II, Pt. 1, except for "All Others," which is estimated.
[3] Longshoremen, fishermen, lumbermen, hod carriers, etc.
[4] Barbers, chefs, police, elevator operators, etc.
[5] Bus, truck, and taxi drivers, crane operators, meat cutters, factory machine operators, etc.
[6] Unemployed, retired, widows, members of the armed forces and students when heads of households, but not persons in institutions, those keeping house nor those unable to work.
[7] Data for 8 of the 10 was from information sheets sent in with soil samples to the New Haven Agricultural Experiment Station.

HOW MEHRING CONDUCTED THE NEW ENGLAND SURVEY

To obtain data for this study, the author interviewed personally a carefully selected cross-sectional sample of non-farm private households in New England. To round out the sample, about 40 questionnaires were handled by mail. Distribution of the sample by States and by localities is shown in Table 7.

It has been found that the average of a properly selected sample in a survey of this kind is likely to fall within the limits, as determined by the standard error, of the true mean for the entire population. The error may be computed from the individual determinations composing the sample.

The sample may be scientifically selected so as to include all factors which influence the mean in the same proportions that they occur in the total population. This is considered the best method of sample selection when all the factors are known and can be controlled. If not, a random sample selected so that all elements have an equal chance to be included in the sample also will give satisfactory results.

If all the factors are known, but only some can be controlled, then a combination of the two methods is likely to give the best sample. This combination approach was used in the present study.

It was found from the previous study ("Characteristics of The Non-Farm Fertilizer Market," Plant Food Review, Fall 1957) that the factors which tend to influence the usage of fertilizer on lawns and gardens are: (1) geographical location; (2) population of the community; (3) occupation; (4) economic status; (5) race, and (6) personality. Some of these are interrelated.

The geographical factor is a composite of climate, soil and local customs. It is evident, for instance, that a resident of Miami, Fla., is likely to use many times as much fertilizer as a resident of Providence, R. I., even though the two cities have almost identical populations. However, this factor is easy to evaluate by studying each geographical region separately and selecting a sample that reflects all of its parts.

In the larger cities, a majority of the people live in apartments and row houses. Even the detached homes usually are on small building lots. Thus the majority of city dwellers have little opportunity to use fertilizer except on house plants, and purchase small package goods as a rule. Nevertheless, most large cities have suburban areas where people have large lawns and both flower and vegetable gardens.

Table 7—Number of Homes and Localities Sampled, By States

State	Localities	Homes
Maine	14	57
New Hampshire	13	32
Vermont	21	110
Massachusetts	33	132
Rhode Island	17	84
Connecticut	32	201
Total	130	616

In the smaller cities and villages, most of the dwellings are detached houses on relatively large lots with plenty of room for lawns and gardens. Moreover residents of smaller communities frequently have more time to spend in home activities than city cousins. Thus size of community is an important factor, but also one that can be evaluated in selecting the sample.

Occupation is another important factor, but one which cannot be so easily controlled. As groups, management and professional people invariably use more fertilizer than laborers and machine operators. However, extreme variations occur among people included in each occupational class. Variations within an occupational group in localities of the same size are due to economic status and personality traits.

The factor of economic status is not easy to reflect accurately. A proprietor, for instance, who lives in an apartment above his store is hardly likely to use as much fertilizer as his counterpart with identical economic status who lives on a 5-acre estate in the suburbs. To overcome this problem, considerable care was given to selecting the sample so that all kinds of neighborhoods in each city and town would be represented in the total sample in about the same proportion as the neighborhhod population bears to the total population.

The effect of the economic factor also varies among communities of the same size. Other things being equal, it was found that fertilizer use per household decreases in about the following order: residential suburbs, college towns, resorts, county seats, ordinary towns remote from other communities, factory towns, and mining, fishing and lumbering towns.

The factor of race is easily handled in that a sample can be selected so as to contain the correct proportion of the different races in the total population. This factor also can be left to random sampling and the results corrected with the use of available census data.

Personality is the only factor that can neither be selectively sampled, nor adjusted mathematically for imperfect sampling. Some people, regardless of cultural background, education or economic status simply are not interested in gardening. Others are horticultural hobbyists, and even when living in an apartment or rented room will have house plants or window boxes. Still others, who won't work at gardening themselves, have extensive lawns and gardens as a matter of community pride or prestige that are usually cared for by a gardener or lawn-care company. This means that somebody other than the householder himself usually makes the decisions on how much and what kind of fertilizer to use.

The author believes that the personality factor tends to average out when all other factors are sampled selectively on a random basis. This belief was tested during the sampling for the Middle Atlantic States. Results were averaged separately for the first and for the second fifty homes sampled in Gettysburg, Pa., and in Washington, D. C. Each fifty was a random cross-section sample. The means for the two groups in each city were well within the standard error of each other, while the means for the two cities as a whole were quite different.

Cities and towns visited in making the survey included one or more in every size category listed by the census for urban communities in New England. An attempt was made to include as many communities in each size category as possible within the practical limits of the travel schedule.

In each new community, the author first visited several stores where fertilizer was sold and made a list of every grade and kind available, package sizes, prices, and appearance of any packages with which he was not already familiar. This help-

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In cold weather or warm, it always pays to specify SPENSOL GREEEN Nitrogen Solutions. Next time you order nitrogen solutions be sure to contact your Spencer Representative.

*SPENSOL GREEEN is a registered trademark of Spencer Chemical Co.

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SPENCER CHEMICAL CO., Dwight Bldg., Kansas City 5, Mo. District Sales Offices: Atlanta, Ga.; Memphis, Tenn.; Kansas City, Mo.; Omaha, Nebr. Works: Pittsburg, Kans.; Chicago, Ill.; Henderson, Ky.; Vicksburg, Miss.; Orange, Texas.

Insist on SPENSOL GREEEN (Spensol Nitrogen Solutions)

ed considerably in refreshing the memory of people who had forgotten facts needed in the survey.

In the smaller cities, an attempt was made to obtain data from at least one home in every block on each street. In the larger cities, a map was studied carefully in advance, and a course plotted from one side to the other across the business section in such a way as to represent a cross section of the various types of neighborhoods. After a day or two of work, it usually was found necessary to visit one or more other sections of the city to round out the sample. In the small towns and villages, usually only one or two homes were sampled.

The first adult encountered in each block was interviewed. If nobody was outside, the house, nearest the center of the block was selected on the side of the street first encountered. If nobody answered the knock, the next house was substituted. If the building selected was other than a residence, it was also entered and the first person met inside was interviewed.

Each person was asked whether he or a member of his immediate family had used any commercial fertilizer in the preceding 12 months, and if so, how much and what kind. The facts were recorded with the occupation of the head of the household—when the interview occurred at a residence—and of the worker, when the interview occurred as a non-residential location. Farmers, persons connected in any way with the manufacture or sale of fertilizer, and those in institutions were excluded from the survey.

An entry was made for every interview including those who said no fertilizer was used and those who said they couldn't remember. In the latter case, a little conversation usually either produced the facts or developed enough information on which to base a reasonable estimate. Patrons of lawn-care companies gave the most trouble because they usually had no idea of how much or what kind of fertilizer had been applied. In these cases, the dimensions of the lawn were stepped off and the name and address of the company noted. If the company was unwilling or unable to supply the information, it could be estimated satisfactorily on the basis of the company's usual practice.

In the computations of the means and standard errors, all fractions were rounded off to the nearest pound except those of less than one pound, and where the mean was less than 10.

The crude mean for consumption of fertilizer per home in New England turned out to 42.7(+—)3.6 (See Table 4). This means was corrected for deviations of the sample from the true percentages of the population in each size-of-city group. This was done by weighting the group means in the last column of Table 4 by the percentages of the total population actually living in each group of communities. This weighted average is 45.3, or 2.6 pounds higher than the crude mean.

The crude mean also was corrected in the same manner for occupations with the aid of the data in Table 6. This correction reduced the crude mean by 3.8 units.

No correction was needed for race inasmuch as the sample contained the correct proportions of each race in relation to the total population.

The original sample had been so chosen as to average out the factor of economic status, so that no correction was needed in this case either.

No correction is possible for the personality factor. It was necessary to leave this factor to random sampling within the limits set by all the other selections involved in the survey.

The algebraic mean of the corrections for size-of-community and occupation is a minus 1.2 pounds. Therefore, the corrected mean for fertilizer consumption per home in New England is 41.5(+—)3.6 in the year ended June 30, 1959.

The data for the amount of fertilizer used on each type of vegetation are less exact than the other data accumulated. This is because most persons used fertilizer from a single package for several purposes, and found it difficult to say how much had been used for each. Nevertheless, after a little prompting, and occasionally, help from other members of the family, it usually was possible to arrive at a reasonable estimate.

One factor that had a considerable influence on the New England data is the unique situation that exists in the Boston metropolitan area. As a rule, the part of a city's metropolitan area not in the central city is composed largely of suburbs with detached homes. Boston is the only city in the U. S. that has other large cities within its metropolitan area that have a smaller percentage of detached houses than the central city itself.

The 52 other cities that comprise the Boston metropolitan area contained 445,338 dwellings in 1950, more than twice as many as the 222,079 located in Boston itself. Detached homes comprised 10.5 percent of the total in Boston itself, but Cambridge with a population of 120,740 and Somerville with 102,351 had only 9.8 and 9.9 percent of detached dwelling units respectively. While data is not available for Brookline because it is not incorporated, the percentage of detached dwellings is probably about the same as for Boston itself. Brookline is almost entirely surrounded by Boston, but is in another county. In addition, six of the 17 incorporated cities in New England with 50-100 thousand population are part of the Boston metropolitan area.

As a result of this situation, the mean consumption per home for all New England cities in the 50-100 thousand and the 100-250 thousand classes is probably smaller than it would have been had these cities in the Boston metropolitan area been remote individual communities.

On the other hand, the existence of a number of principally suburban communities of from 25-50 thousand within the Boston and Providence metropolitan areas probably is responsible for a higher mean for cities in this class than had they been remote individual communities with their own business and industrial districts.

Agriculture Uses More Steel Than Automobiles

The farms of the US annually use more steel than goes into automobiles. Half the fresh water used in the US goes for irrigation. More than 40,000,000 tons of chemical materials are needed by agriculture each year.

V-C Has New Premium Fertilizer

Virginia-Carolina Chemical is introducing a new premium fertilizer this Spring and backing it with the most intensive advertising campaign in the company's history.

The new product—V-C Harvest King—will be sold from all of V-C's 23 sales offices across the eastern two-thirds of the country.

Chief difference between Harvest King and V-C's regular fertilizer is that the new product is fortified with a combination of six trace elements, added to the fertilizer via an exclusive mineral mix the company calls Vitel.

USE OF FERTILIZER TO CUT COTTON PRODUCTION COSTS

by NIVEN D. MORGAN

The future of the cotton industry will depend largely on the proper use of fertilizer to cut unit costs of production and to increase net income.

The farmer who uses good production practices, including the needed fertilizer, can grow cotton in competition with synthetics.

Cotton is, and will continue to be, a very important crop in the United States for the farmer who follows good production practices. Fertilizer is one of the very important factors affecting economical cotton production in this Country. In far too many instances it has not been given the needed emphasis. Consequently, cotton farmers today are deriving only a small portion of the possible net income from this crop. The proper use of fertilizer will make more money for the farmer than increased acres of hungry or improperly fertilized cotton.

How much of a farmer's cotton is profit? The answer to this question is dependent on price, yield and production costs. Most costs other than fertilizer harvesting and ginning are approximately the same regardless of yield. Consequently, low yields mean high production costs per pound of lint and little or no profit.

Farmers in this Country would increase total profits from cotton from 203 million dollars to 487 million dollars by reducing production costs from 28 cents per pound of lint to 22 cents per pound. Fertilizer is a major item in lowering unit cost of production.

In Tennessee with a yield of 425 pounds of lint and a price of 33 cents the profit per acre would be 48 dollars or a total net income of $26,274,000.00. However, a potential yield of 750 pounds of lint would give a profit per acre of approximately 127 dollars which would be $69,517,000.00 net income for the state. Such an increase in net income could only be possible by using fertilizer to increase yield and to cut unit cost of production.

In Georgia it has been estimated that an additional 97,000 tons of 4-12-12 fertilizer and 10,400 tons of extra nitrogen would increase the cotton farmers income $24,920,000 above the extra fertilizer costs. A summary of the Five Acre Cotton Contest in Georgia shows that by increasing the fertilizer per acre from 316 pounds of 4-12-12 with 27 pounds of nitrogen side-dressed to 850 pounds 4-12-12 and 51 pounds nitrogen side-dressed the profit per acre would be increased from 83 dollars to 295 dollars.

In California on highly productive soils, the addition of 16 dollars worth of fertilizer reduced the production cost per pound of lint from 19 cents to 16.9 cents. By doing so, the profit per acre was increased from $95.96 to $149.69. In another case, data by Dr. Mikkelsen shows that 15 dollars worth of fertilizer increased the net profit per acre from $137.03 to $258.90 by increasing yield and reducing unit cost.

Typical costs and profits for cotton in South Carolina at two levels of fertilization shows that with the lower level of fertilization the cost per pound of lint was 28 cents per pound, and the profit was only $15.51 per acre whereas with the recommended fertilization the cost per pound of lint was reduced to 22 cents per pound and the profit per acre was increased to $56.94. Data from the Cotton Production Contest in South Carolina shows that when the fertilizer was increased from 58-65-69 to 83-102-147 the profit per acre was increased from 22 dollars to 283 dollars. The use of fertilizer paid big dividends.

In Arkansas data collected by the Agricultural Extension Service from the Cotton Fertilizer Demonstration-al Program shows that it is very profitable for farmers to use the recommended fertilizer, and very unprofitable when they use less than recommended amounts. However, the data also shows that above average farmers may profitably use above average fertilizer recommendations. The 70-30-60 gave a return per acre of $50.54 for fertilizer whereas a 35-0-0 gave only $17.25 per acre. In another case the return from the recommended fertilizer was $44.40 per acre whereas the return for the above average fertilizer recommendation was $50.13.

Table 1.—Cotton Costs Per Acre

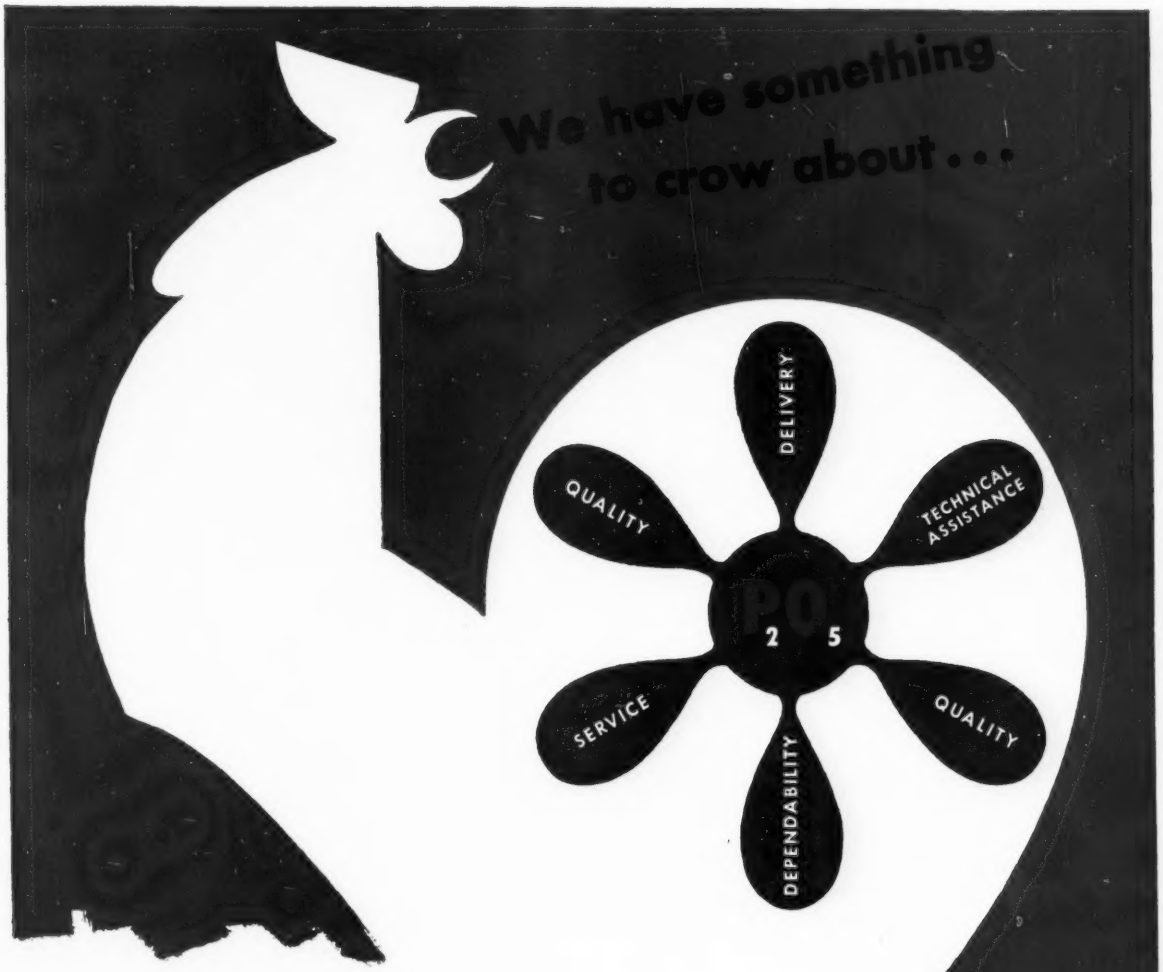
Cutting Stalks	$ 0.75
Land Preparation	5.50
Seed	2.00
Fertilizer	--
Fertilizer Application	--
Planting	2.00
Pre-Emerge	4.00
Post-Emerge (2)	3.00
Cultivations	7.50
Flaming (3)	6.00
Hoeing	3.00
Insect Control	25.20
Defoliation	6.00
Miscellaneous	5.00
Interest on Land and Equipment	30.00
Picking Per Bale $40.00	--
Ginning Per Bale $15.50	--
	$99.95

Experiment Station yield data was taken from Arkansas and Louisiana and production costs, net operating returns per acre. and the net operating return for fertilizer per 100 acres were calculated. In table 1, Cotton Costs Per Acre, the fertilizer costs were not listed because they varied according to the fertilizer treatment. However, the costs were included in the calculations. A price of 32 cents per pound

Table 2—Fertilizer Increases Cotton Profits — Arkansas

Fertilizer Treatment	Cotton Yield Seed	Cost per Acre	Cost per Pound Lint	Net Operating Return per acre	Profit from Fertilizer 100 acres
0-0-0	1558	$157.67	$0.27	$ 26.41	
60-30-30	2746	$216.63	$0.20	$107.28	$8087.00
0-0-0	1746	$164.33	$0.25	$ 40.99	
60-30-30	2421	$204.41	$0.22	$ 80.56	$3957.00
0-0-0	1896	$169.88	$0 24	$ 53.14	
60-30-30	2912	$224.22	$0.20	$119.16	$6602.00

Dr. Morgan is an agronomist with American Potash Institute at Shreveport, La. This paper was prepared for presentation at the Beltwide Cotton Production-Mechanization Conference, January 14, 1960, Memphis, Tennessee.



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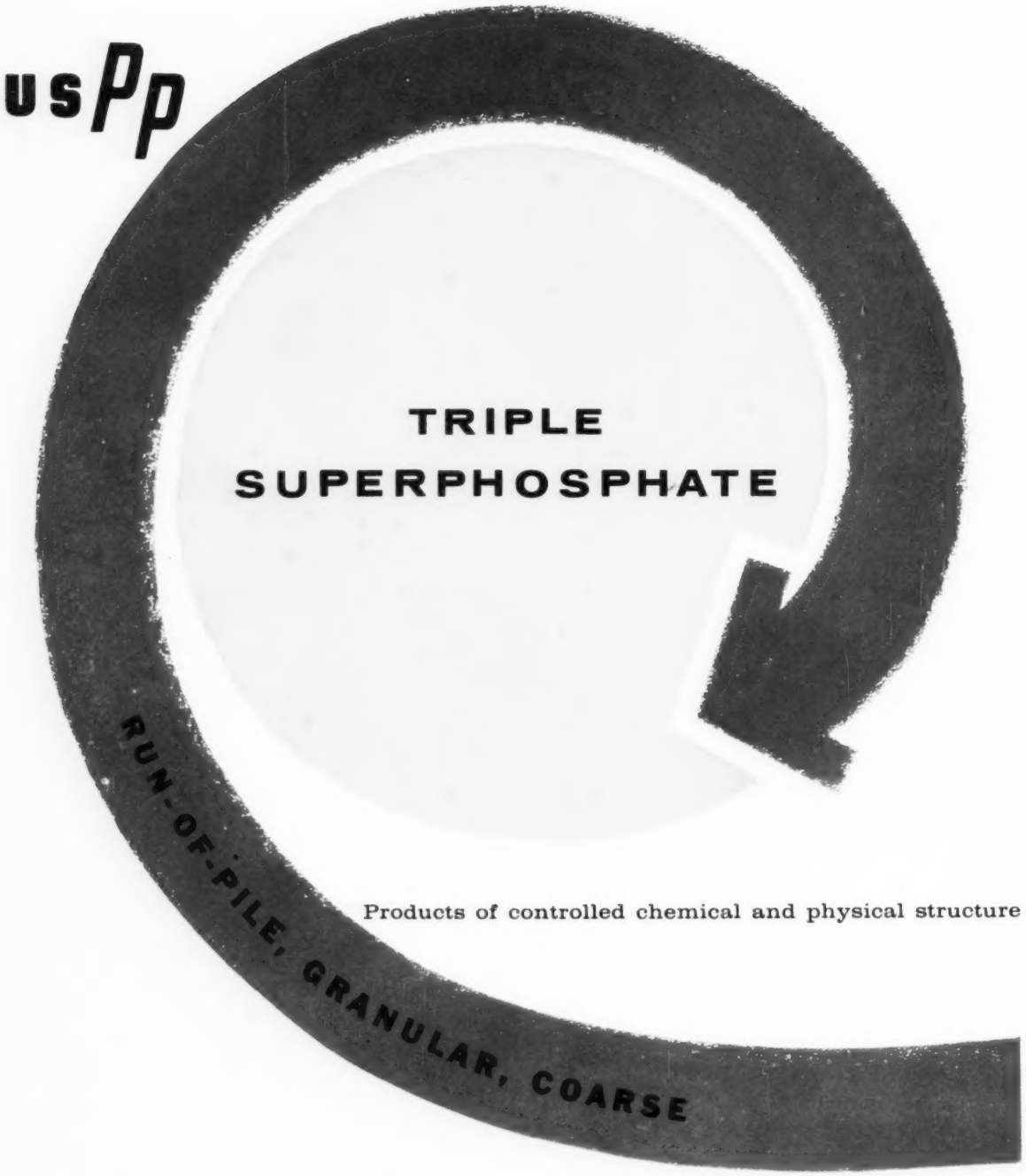

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Table 3—Fertilizer Increases Cotton Profits — Louisiana

Fertilizer Treatment	Yield Seed Cotton	Cost per Acre	Cost per Pound Lint	Net Operating Return per Acre	Profit from Fertilizer 100 Acres
0-0-0	564	$115.04	$0.57	$ 47.78	
48-48-48	1482	$172.50	$0.32	$ 2.73	$5051.00
0-0-0	1374	$151.01	$0.30	$ 11.83	
72-48-48	2610	$217.01	$0.21	$ 90.97	$7914.00
0-0-0	2847	$205.40	$0.18	$130.90	
80-40-40	4046	$269.59	$0.16	$208.31	$7741.00

of lint, and a price of 40 dollars per ton of seed were used. The costs are based on actual expenditures of good farmers and data collected by Experiment Stations. In some cases the costs may seem high, but the farmer who can cut them and maintain high production will receive a greater net return than shown in tables 2 and 3, which will be to his advantage.

When the costs of fertilizer, picking, and ginning are added to the costs listed in table 1, the saying by farmers that "it takes the first bale of cotton to pay the costs" is usually correct. However, in some cases, the costs are greater than the returns for the first bale of cotton.

In a fertility experiment as shown in table 2 (p. 35), the 60-30-30 treatment increased the yield of seed cotton from 1558 pounds to 2746 pounds. The cost per pound of lint without fertilizer was 27 cents. The fertilizer reduced the cost per pound of lint to 20 cents. In this case the profit per 100 acres for fertilizer was $8087.00. The net return for the use of fertilizer was 6 to 1 for each dollar invested in fertilizer.

Also, in table 2, data shows that by increasing the fertilizer from 0-0-0 to 60-30-60 that the yield was increased from 1896 pounds seed cotton to 2912 pounds. The cost per pound of lint was reduced from 24 cents to 20 cents. The profit from fertilizer was $6602.00 per 100 acres. The net return per dollar invested in fertilizer was 4.6 to 1. However, in most cases, it is not the greatest net return per dollar invested in fertilizer which makes the farmer the most money. The greatest net return per operation is the determining factor in the income of the farmer.

Data from the Louisiana Agricultural Experiment Station, table 3 above, shows that fertilizer not only decreases the cost per pound of lint cotton but also shows great profits from the use of fertilizer. Also, in many cases it is the return from fertilizer which insures many other production costs. In one experiment, as shown in table 3, where the yield of seed cotton from the 0-0-0 treatment was 564 pounds the cost per pound of lint was 57 cents and the net operating return per acre was a loss of $47.78. However, the 48-48-48 fertilizer treatment gave a yield of 1482 pounds of seed cotton at a cost of 32 cents per pound. The use of fertilizer in this case brought the operation out of the red and into the black column — difference being $5051.00 in favor of the fertilizer.

In another experiment, as shown in table 3, the 0-0-0 fertilizer treatment gave a yield of 1374 pounds seed cotton at a cost of 30 cents per pound of lint. The 72-48-48 treatment increased the yield to 2610 seed cotton and reduced the cost per pound of lint of 21 cents. The profit from fertilizer in this case was $7914.00 per 100 acres. The net return per dollar invested in fertilizer in this case was 4.3 to 1.

In another fertilizer experiment, table 3, on a very good soil, the 0-0-0 treatment gave a yield of 2847 pounds seed cotton at a cost of 18 cents per pound. The 80-40-40 treatment increased the yield to 4046 pounds seed cotton with a cost of 16 cents per pound of lint. Even though the yield was very good without any fertilizer, the profit from using 80-40-40 was $7741.00 per 100 acres.

In conclusion, the future of the cotton industry is dependent upon the proper use of fertilizer to cut unit costs of production and to increase net returns. The farmer who does not use the proper balance of fertilizer in the amount needed will be the farmer who goes out of cotton production. The farmer who uses good production practices including the needed fertilizer can grow cotton in competition with the synthetics of today.

Fertilizer pays its costs, insures other costs and returns large profits to the farmer for its use. Use more, not less, and stay in the cotton business.

Note: The writer expresses appreciation to the University of Arkansas, University of California, Clemson Agricultural College, University of Georgia, Louisiana State University, University of Tennessee and the National Plant Food Institute for the data used in this paper. Presented at Beltwide Cotton Production-Mechanization Conference, January 14, 1960, Memphis, Tennessee.

Highlights of USDA on "Chemicals and Foods"

Our food supply in the United States is the safest, cleanest, and most wholesome in the world. The Department of Agriculture takes pride in the part it has played in making this true.

The Department considers that the safety of the Nation's food is its first responsibility in carrying out assignments from the Congress. This principle guides USDA research programs and regulatory and service activities pertaining to foods and to the use of chemicals in food production and distribution.

The Department intends to continue and intensify its efforts to insure that American consumers get the foods they need and want, in adequate quantities at a reasonable price, and that these foods continue to meet the highest standards of nutritional quality and wholesomeness. It strongly endorses the safe use of carefully tested chemicals as required to maintain the excellence, variety and economy of the foods we eat.

We cannot continue to produce adequate amounts of safe and wholesome foods without chemicals. Abandoning their use on farms and in the food industry would result in immediate decline in the quantity and overall quality of our food supply and cause a rapid rise in food prices paid by consumers.

The use of chemicals in foods themselves is as old as the practice of preserving meat with salt . . . and as new as the addition of thiamine to bread.

In 1955 there were 2,691,000,000 people. Since then the population has been increasing 50,000 a year.

Insert Solves Cyanamid Problem

American Cyanamid has been working with Land Grant Colleges and Extension people to demonstrate that proper fertilization and management will step up high quality forage, and thus increase milk production. Getting this over to farmers was a problem. The story is long, full of data. They wanted color for emphasis. And they wanted to make it easy for the farmer to keep.

The solution was an insert in the proper editions of "The Farm Journal" magazine, so constructed that it could easily be lifted out and retained. Run in four colors, it featured their Aero Urea, 45% N fertilizer—and is doing the job they wanted to do.

CALIFORNIA

American Chemical, soon to be in production with their new petrochemical plant there, have established headquarters at Long Beach. The new operation is jointly owned by Richfield Oil and Stauffer Chemical.

GEORGIA

Cotton Producers Assn., Cordele, are adding a granulating unit. Equipment and construction are being handled by D. M. Weatherly Co., Atlanta and include complete facilities for ammoniation, drying, cooling, screening and ammonia recovery. Product will have a particle size range between six and sixteen mesh.

* * *

C. O. Smith Guano Company began production of granular goods at Moultrie last month. The firm installed a dryer and cooler late last year, and Fertilizer Equipment Sales Corporation, Atlanta, modified the ammoniator and furnished screening and air handling equipment. The plant utilizes a series-screening operation, removing the fines first and offering selective screening of 14, 12, 10 and 6-mesh fractions depending on the grade, product specifications and recycle rate desired. Three 5 x 12 single deck screens are employed; each is made up of two 5 x 6 sections with a Y-valve for each section, so that the entire fraction or only half the fraction passing through each deck can be independently routed to storage or recycled to the ammoniator. Processing capacity of the new production unit exceeds 20 tons per hour on granular products and runs more than 60 tons hourly on conventional powdered fertilizers.

KENTUCKY

Ohio Valley Fertilizer, whose Maysville plant was destroyed by fire last May have put into production their new $300,000 plant which is twice the size of the old one, and modern in equipment. General manager Nooe says they serve a tri-state area of 150 miles, extending as far East as Charleston, W. Va.

LOUISIANA

Monsanto has put into production the first computer controlled plant in its field, and one of the two "firsts." This equipment has been added to their existing ammonia operation at Luling, and vice-president J. L. Christian reports performance up to expectations.

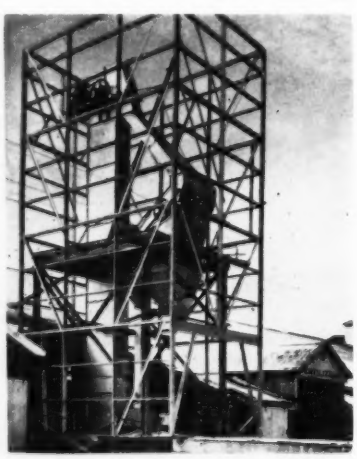
The computer supplies direct, on-line control of the overall process, and is an RW-300 digital control computer made by Ramo-Wooldridge division of Thompson Ramo-Wooldridge, Inc. The device constantly monitors process conditions, making numerous calculations and automatically adjusts controls for best results.

Monsanto announced this development in 1958, and made the installation for "maximum productivity at minimum operating cost.

NEW JERSEY

Dayton Fertilizer Corporation expected almost doubled capacity at their Dayton fertilizer plant when a new screen, pulverizer, elevator and hopper went into operation last month. The equipment installed in a new wing of the present physical plant should enable Dayton to increase capacity to almost 200 tons a day of standard and special-formulation fertilizer. All equipment has been engineered and fabricated by Sturtevant Mill Company, Boston, Mass. Sturtevant engineered the original plant in 1952, and fabricated all original processing equipment.

The wholly closed-circuit operations at Dayton allow quick changeover from standard formulations to special fertilizer requirements. By installing the additional wing, Dayton expects to increase capacity without having to add manufacturing process equipment. The existing Sturtevant mixer, screen and other units, which were installed with possible future expansion in mind, will meet adequately the increased demand. Dayton's market is primarily within the surrounding agricultural region.



The new wing and equipment of the Dayton Fertilizer plant just prior to completion.

TEXAS

Texas Gulf Sulphur Company has disclosed plans for construction of a plant for treating sulphur by filtration to be located at its spindletop mine near Beaumont. The plant is expected to cost about $1,000,000. It will operate in connection with nearby shipping facilities at the company's new Neches River Terminal.

Contract for construction of the plant has been awarded to Consolidated Western Steel Division of the United States Steel Corporation. Construction is due to begin about March 1, and completion is scheduled for mid-summer of 1960.

According to Claude O. Stephens, Texas Gulf president, the plant is designed to treat the dark variety of sulphur and provide from this material sulphur of higher and more uniform quality.

WASHINGTON

Calspray expects to be in production on liquid fertilizers by the end of this month in their $5,000,000 plant at Kennewick. This went into production on ammonium nitrate in November, and is expected to be turning out complex plant food by April.

The plant is located near Phillips' $17,000,000 NH_3 plant. General Chemical are expecting to complete a plant in the same industrial area.

The plant was started in the Spring of last year, and as a final unit, Gunderson Bros. have shipped a forty-ton tank "big as a 2-bedroom

house," travelling 200 miles by water.

* * *

Van Waters & Rogers, Inc., Portland, Ore., pioneer Western distributor of "Northwest" brand fertilizer, has leased approximately 44,000 square feet in the 375-acre industrial and warehouse depot of the Pasco, port district.

The space will be used to store and distribute "Northwest" brand fertilizer, and the initial fertilizer inventory will be between 5000 and 10,000 tons, shipped by rail from Medicine Hat, Alberta, Canada, according to Jack Johnston, Van Waters & Rogers' manager for fertilizer in the Portland office.

Superintendent of the Pasco warehouse space will be Dave Palodichuk, with Van Waters & Rogers in Portland for the past five years, and the work force will be hired locally. Franz Sunitsch, company agricultural representative, travels the area from headquarters in Yakima, Washington.

Besides the offices in Portland and Seattle, where the company has its headquarters, Van Waters & Rogers, Inc., has local distribution plants in Spokane, Boise, and Vancouver, B. C. The firm operates throughout the West from 23 plants in the principal cities of 11 Western states. Its annual sales amount to more than $80 million, and the firm employs more than 1400 persons. It also distributes industrial chemicals, laundry and upholstery supplies and baler twine.

WISCONSIN

Organic Compost Corp. has announced an expansion program that will more than double sales volume when completed. This includes a 50% expansion of its Germantown home plant, and the establishment of a plant near Philadelphia the size of the present plant. According to George T. Klein, president, the program will cost some $300,000.

The new program will include installation of automatic equipment for processing and packaging the organic goods which are sold under a number of own brands, and some private labels. Mr. Klein says sales climbed 34% over 1958, to nearly $500,000 for 1929.

* * *

Milwaukee is undertaking a $2,500,000 installation of dryers which will increase their production capacity of Milorganite by 25%. Milwaukee Boiler has built the new units, which are replacing the existing dryers. With the new equipment is expected to be able to produce 250 daily tons from 300,000,000 daily gallons of sewage sludge.

CANADA

Brockville Chemicals plant under construction at Maitland, Ont., is planned for completion in mid-1961, and to have a designed capacity of 66,000 annual tons of ammonia and 500,000,000 cubic feet of hydrogen. Facilities for conversion of part of the ammonia are included, and 60,000 annual tons of nitric acid, 50,000 of ammonium nitrate, 50,000 of nitrogen solutions are in the program.

The company, in which Belgian-backed Sogemines Ltd. is principal stockholder, has just raised $17,200,000 through first mortgage bonds and preferred shares.

In our January item about this concern, the statement "The Maitland Works of Du Pont will supply the anhydrous ammonia and hydrogen by pipeline" **should have** read "The Maitland Works of Du Pont will be supplied with anhydrous ammonia and hydrogen by pipeline," as Brockville Chemicals will be the producer of these materials.

EGYPT

The Government is planning a new company to handle a project running to $1,400,000 to take some 400,000 annual tons of phosphate from the Nile Valley between Esna and Edfu.

ENGLAND

Fisons is to become a holding company under which their various enterprises in the plant food field will be grouped. This includes the new Fisons Horticulture, reported here last month, the various fertilizer companies which will be grouped into a subsidiary, Fisons Fertilizers.

Hereafter the Fisons board will cease to be an operating function, operations being placed under two managing directors,—J. W. Napier and A. Wormald.

* * *

British Titan Products has installed at the Grimsby works the first ferrous sulphate decomposition plant in the United Kingdom—facilities for producing SO_2 for sulphuric acid manufacture. The plant decomposes dried ferrous sulphate with coal in fluidized bed roasters.

FORMOSA

China Technical Consultants, Inc., is planning a plant to be built in Kaosiung which is to have a fertilizer capacity of some 50,000 annual metric tons. It will be financed by a group of local investors and will be the first privately owned chemical fertilizer plant on the island of Taiwan.

INDIA

National Chemicals and Fertilizers Corp. is being set up by the Government to bring all fertilizer factories in the public sector under a single corporation, under control of the Ministry of Commerce and Industry. Details of the plan are yet to be worked out, but should include the great Sindri operation as well as those at Nagal and Trombay.

* * *

Bhilai, the sulphuric acid plant which has been building for some time is to be completed shortly, and is to produce some 12,000 annual tons. The acid will be used to produce ammonium sulphate from ammonia recovered from coke-oven gases.

JAPAN

Ube Industries in Yamaguchi Prefecture and **Toyo Koatsu** in Fukuoka Prefecture are planning similar plants to use petroleum instead of coal as a source of gas for fertilizer manufacture.

NETHERLANDS

Hoogovens has signed a contract with State Gas Enterprise which will bring them 200,000 daily cubic metres of natural gas for use as a fertilizer base. This process will replace one which has become less attractive economically. The new equipment is to be in operation by the end of this year.

NORWAY

Norsk Hydro are planning an ammonia plant which would use waste gases from the Norwegian State ironworks at Mo. On the same site they plan a plant for production of ammonium sulphate.

Norsk Hydro's nitrogen output is steadily climbing. The 1958-59 operating year showed a record 242,000 tons of N and a further increase in urea production with capacity now at 75,000 annual tons.

PAKISTAN

P.I.D.C.'s natural gas fertilizer plant at Fenchuganj, Sylhet is going along well. Heavy equipment and machinery for setting up is on the site, and the pipeline for Haripur is expected to reach there by April or May.

Being built at an estimated cost of RS 23 crore, the plant is to have capacity for 100,000 annual tons of urea, and to be completed in November of next year. Contract has gone to Kobe Steel Works, Japan.

What happens to NITROGEN FERTILIZER *applied in the Winter?*

"Since the fall-applied fertilizer lies in the soil for some time before the plants use it, some of the nitrogen may be lost by leaching or by conversion to gas by soil microbes. The extent of the loss will depend on the weather, soil conditions, and possibly the kind of nitrogen carrier that is used.

When considering winter applications of nitrogen fertilizers, we would like to know how efficient such a practice will be under different rainfall conditions. In other words, how much of the nitrogen added in the fertilizer will be leached from the soil; how much will be lost through the action of soil microbes; how much will remain in the soil after a crop has been grown; and, most important, how much of this nitrogen will the crop itself be able to use?

Previous experiments at Urbana have shown that the greater the amount of water added to the soil ("rainfall"), the greater the nitrogen loss through leaching. As a result, less nitrogen is taken up by the crop. The experiments just completed with the lysimeters on the Agronomy Farm help tell what happens to the nitrogen in fertilizer that is added to the soil in the winter. Lysimeters are large soil-filled containers constructed below ground for measuring the percolation of water through soils. The amount of soluble plant nutrients, such as nitrogen, carried down with the drainage water can be determined with these devices.

Nitrogen fertilizer (ammonium sulfate) containing "tracer" nitrogen was added to the lysimeters in the winter. "Tracer" nitrogen is a special kind that can be distinguished, by certain laboratory methods, from the ordinary nitrogen found in soils and fertilizers. Except for this aspect, "tracer" nitrogen is no different from ordinary nitrogen and is used just as readily by plants. Water was added at different rates to different lysimeters to imitate winters of low, moderate, and high rainfall.

During the summer, corn was grown on the lysimeters and then harvested. The amount of "tracer" nitrogen and also the total amount of nitrogen in the corn were determined in the laboratory. With this information it was possible to determine the amount of nitrogen obtained from the fertilizer. The percolation water (leachate) that drained from the soil in the lysimeters was collected and tested in the laboratory in a similar way. Results are shown in Table 1.

After the corn was harvested, a second application of nitrogen fertilizer was made during the winter. Another crop was grown the following summer, and the corn and leachate were both tested in the laboratory as before.

At the end of the second cropping season, soil samples from the lysimeters were tested. The amount of fertilizer ("tracer") nitrogen and also the total amount of nitrogen remaining in the soil were determined. Results are shown in Table 1.

Results: In the course of this two-year study, about a third of the nitrogen added as fertilizer had disappeared, apparently having left the soil after being converted to gas by soil microbes. Over a third of the fertilizer nitrogen was still in the soil at the end of experiment, and the other third was found in the corn and leachate. The relative distribution of the nitrogen found in the corn and leachate varied according to the amount of "rainfall" the lysimeters received. In other words, more fertilizer was eventually used by the corn when there was less winter rainfall to leach it down with the drainage water.

More than one-third of the nitrogen applied in the winter in these studies was lost without benefiting crops that followed. Data on the fate of the fertilizer nitrogen are summarized in the following table:

It should be pointed out that the conditions in these experiments were such that nitrogen losses were as large as we would ever expect to occur. Less nitrogen would undoubtedly be lost under ordinary conditions in a farmer's field.

College of Agriculture, University of Illinois, Agronomy Bulletin No. 120; December 7, 1959.

Table 1—Results of Lysimeter Studies on Nitrogen Fertilizers Applied to the Soil in Late Fall or Winter

Treatment	Nitrogen recovered in pounds per acre		
	Low rainfall	Moderate rainfall	High rainfall
Leached from soil	14	33	43
Found in 2 corn crops	55	51	37
Found in topsoil (0-10")	76	72	42
Found in subsoil (10-38")	25	20	31
Total N recovered	170	176	153
Nitrogen lost	70	64	87
Total N applied	240	240	240

N. C. Completes Soil Test Film

A 15 minute sound and color movie on soil testing has just been prepared and released by the soil testing division, North Carolina Department of Agriculture and the visual aids department of North Carolina State College. The National Plant Food Institute cooperated in the production of this film through a grant made to the soil testing laboratory.

The first part of the film, which is suitable for use with farm groups as well as with fertilizer and lime salesmen and dealer groups, describes in some detail the mechanics of taking a soil sample, this is a section devoted to the soil testing procedures in the laboratory.

Following in order to demonstrate to the grower just how to take a soil sample and just what happens to the sample from the time the farmer sends it in until his soil test report is mailed back.

During the recent meeting of the American Society of Agronomy, the film was extremely well received by the group and a number of those present indicated a desire to use it in their own State programs.

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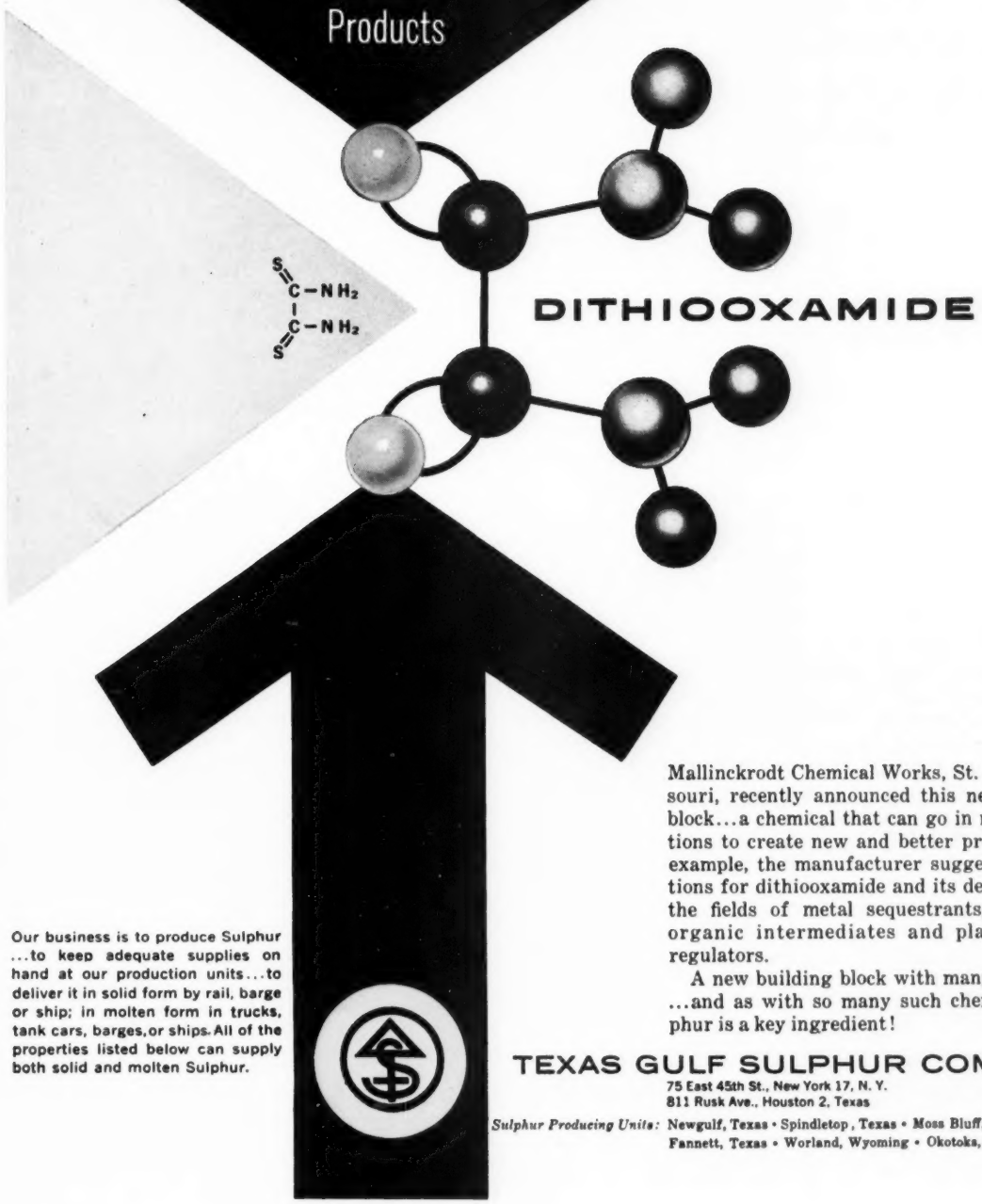

Mallinckrodt Chemical Works, St. Louis, Missouri, recently announced this new building block...a chemical that can go in many directions to create new and better products. For example, the manufacturer suggests applications for dithiooxamide and its derivatives in the fields of metal sequestrants, pigments, organic intermediates and plant growth regulators.

A new building block with many potentials ...and as with so many such chemicals, Sulphur is a key ingredient!

Our business is to produce Sulphur ...to keep adequate supplies on hand at our production units...to deliver it in solid form by rail, barge or ship; in molten form in trucks, tank cars, barges, or ships. All of the properties listed below can supply both solid and molten Sulphur.

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—of This and That . . .

———*"Harnischfeger, We Love You!" . . . The little city of Escanaba on the upper Michigan peninsula was scheduled to throw a big party because it likes a corporation. The blowout was set for Jan. 21-23 in honor of Harnischfeger Corp., maker of cranes and other heavy equipment. Folks there credit the company with pulling Escanaba out of the economic doldrums.*

———*Earman Perry, Supt. at C. O. Smith Guano Co., Moultrie, Ga., had a heart attack New Year's night (Jan. 1st), and was taken to the maternity ward at Vereen Hospital. At first we thought it a casual mistake (not unusual on New Year's night), but seems there was no space anywhere else in the hospital. Cecil Alvis, who is just out of the Army, has taken over until Earman's return to work.*

———*Destined to join with other such ageless quips as "I opened the door and influenza" is the current one about Willie, the new tractor shovel jockey, who thought pneumonia was a fresh car of NH_3.*

———*Here's the able way a Southeast farm paper editor expressed the need for fertilizer: "It isn't possible to write a story about good farming in our area without talking about commercial fertilizer. We often say that in our part of the country we just use the soil to lean the plants against."—from Spencer's Today's Fertilizer Dealer.*

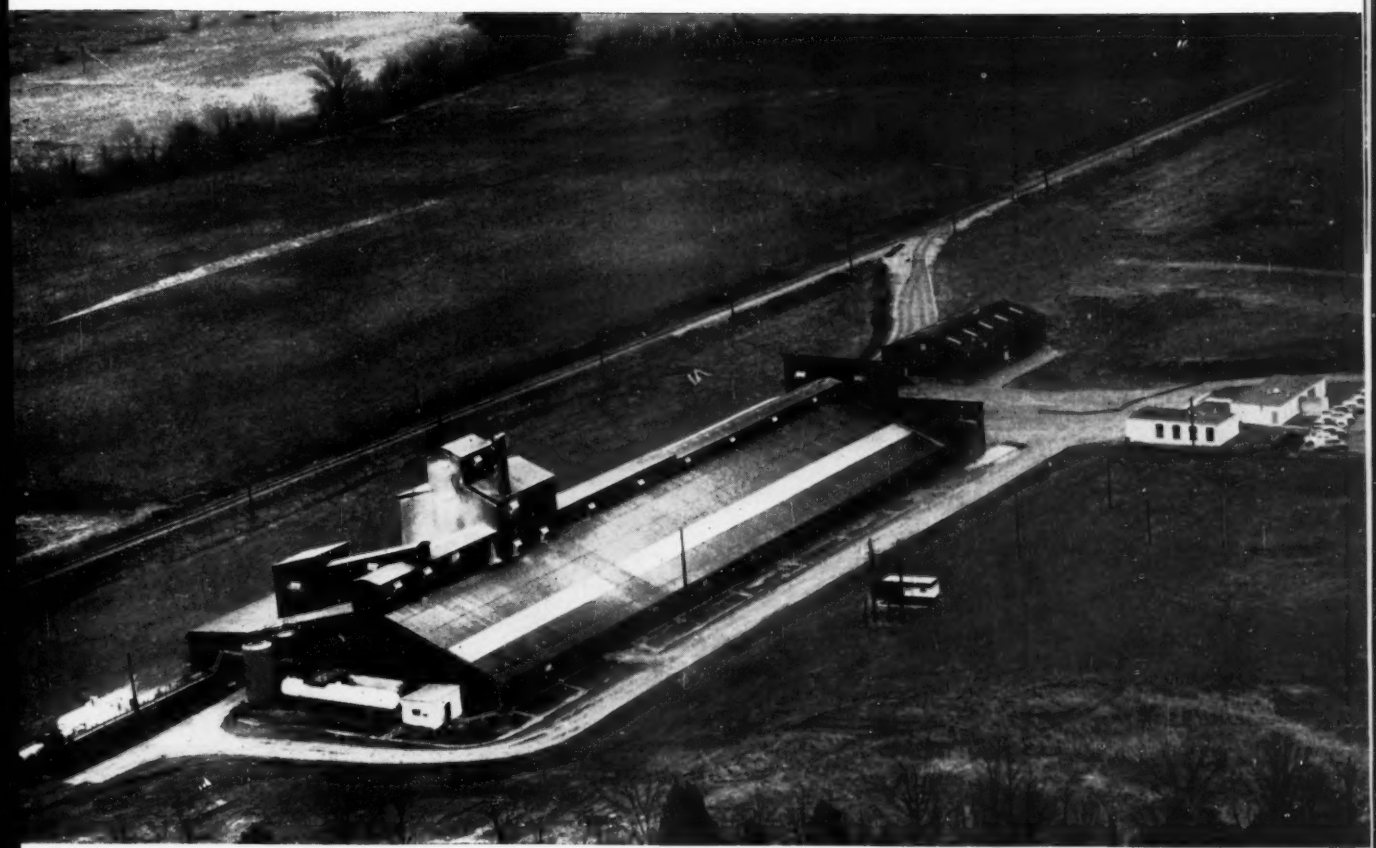
———*The Agriculture Dept. estimates more than 22 million persons—about one-third of the nation's workers—make their living from agriculture. About 20 million are living on farms. Of these, 7½ million are listed as farm workers. In addition, nine million are engaged in processing and distributing farm commodities and another six million in producing and distributing farm production supplies . . . Does it make you nervous to have so many people depending on you?*

———*But relax, friend, for here comes a prominent U. S. oceanographer who says that the world's seas are more than twice as rich in "crop production" as the land areas—(und mit out fertilizer?) Dr. John H. Ryther of the famed oceanographic institution bases his estimate on tests made in three selected ocean areas. He reported his findings to the American Assn. for the Advancement of Science.*

———*Richard K. Peek, president of Percy Kent Bag Co., who has been called the 'Hattie Carnegie of Sack Fashions,' just celebrated his 50th year in the bag business. He was originator of colored and print textile bags for flour and feed, and since 1954 has come up with some startling use of color and intricate design in the multiwall field.*

———*'Louie Tamplin's finest hour' they call it when the fertilizer salesman from Ozark, Alabama stood before four hundred citizens gathered along a railroad track in Indiana to honor him last fall. The occasion was the naming of a railway junction near Jasonville on the Monon Railway, a junction serving the new Virginia-Carolina plant there. Railway and V-C officials decided to name the 'town' after V-C's 'salesman of the year,' who has been selling the company's products for 23 years in southern Alabama and northwest Florida.*

———*Late last year, V-C employees did something special for a man who has done much for V-C: President Justin (Jet) Potter, who has 'injected new life and vitality into the company.' A nationally known artist was commissioned to do a portrait of Jet Potter to hang in the board room at the company's home office in Richmond. Employees all over the country made possible this tribute to the man who, at 61, could have lived in comfort for the rest of his days on the beaches of Florida but instead made considerable investment in V-C and recently told stockholders "You and I have invested our money, but the men and women who work for V-C have invested their lives—and that's more important."*



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Recently completed at Russellville for Cooperative Fertilizer Service of Richmond, this big and fully automated fertilizer manufacturing facility* was built by us in 6 short months.

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PEOPLE in the Industry

IMC

International Minerals & Chemical Corporation has announced the election of John D. Zigler, general manager of the plant food division, and Joseph M. McGarry, director of public relations, to vice presidents of the company.

Zigler

Mr. Zigler, a 27-year employee at IMC, has been general manager of the Plant Food Division since 1956.

Mr. McGarry, who came to IMC in 1956 to establish the company's public relations department, was press relations director at Owens-Illinois Glass Company, Toledo, from 1951 to 1956 and prior to that was a press representative for the Curtis Publishing Company, Philadelphia, and a reporter and Washington correspondent for the Philadelphia Bulletin.

Lawrence A. Roe, director of development in the research, engineering and development division of International Minerals & Chemical Corporation, has been appointed staff director, minerals processing, a new position. He will be responsible for coordinating mineral processing methods within the company and for reporting on new processing techniques in the industry.

Roe

Raymond E. Tuttle, manager of capital request and cost evaluation in the Agricultural Chemicals Division, succeeds Mr. Roe as director of development.

IMC has announced the appointment of two district sales managers for the materials department of the agricultural chemicals division.

Alexander (Pete) McBride is manager for the Kansas City district. He comes to IMC from U. S. Borax & Chemical, and replaces Richard Falck, who transferred to IMC industrial chemical sales in Midland, Texas.

Robert E. Maron, who was a district manager in the company's direct application department, has been transferred to the Materials Department as district manager and will cover the states of Indiana and Illinois.

McNew

Copp

Rainey

Mills

Nitrogen Division

The Nitrogen Division of Allied Chemical has appointed four supervisors in the sales organization: Earl McNew and E. L. Copp, respectively, as sales development supervisor and district supervisor, Indiana district; James L. Rainey, Jr., supervisor of Midwest sales; J. P. Mills succeeds Mr. Rainey as district sales supervisor in the North Central district.

All have been with Nitrogen Division for some time: Mr. McNew, 1953; Mr. Copp, 1955; Mr. Rainey, 1954; Mr. Mills, 1950.

Continental Conveyor

Continental Conveyor and Equipment Co., Birmingham, Ala., has announced the appointment of J. E. Carroll as sales manager. He has been associated with Continental Conveyor's predecessor company (Industrial Division, Continental Gin Co.) since 1944 and has been district sales manager in Atlanta since 1951. In his new position, Mr. Carroll will be in charge of all sales activities with offices in Birmingham until the company's new plant and office building is completed at Winfield, Alabama, in approximately three months.

Carroll

Federal Chemical

J. Walter Harding has been promoted to vice-president of Federal Chemical Co., Louisville, Ky., and B. Hudson Milner has been made a director to replace the retired George W. Shields. Mr. Harding has been the company's secretary and controller. He joined them in 1947. Mr. Milner is executive vice-president of the Louisville Gas and Electric Co.

Armour Fertilizer

Paul Parks has been appointed assistant manager of the Cincinnati division of the Armour Agricultural Chemical Company. He has been division sales aide since 1958.

The appointment was announced by H. Vise Miller, Atlanta, general manager of the firm's fertilizer division.

Stedman

Harold R. Krueger has been appointed to the newly-created position of assistant sales manager of the machinery division of Stedman Foundry & Machine Co., Inc., Aurora, Indiana. Mr. Krueger has been a sales representative at Stedman for the past 5 years.

Krueger

H. J. Baker & Bro.

Retirement of Harold S. McCormick, after a 49 year career in the fertilizer and feed business has been announced by H. J. Baker & Bro., Inc. Mr. McCormick, however, will continue in a consultant capacity with the company.

Starting in 1911 as an office boy with H. J. Baker, Mr. McCormick was executive vice president of the company at the time of his retirement.

Central Farmers

Avery Stutts, general manager of Central Farmers Fertilizer Company's phosphate works near Georgetown, Idaho, resigned his position January 13.

He will be temporarily replaced by Vice President Paul Cairns who will remain until another manager is named.

PCA

Dean R. Gidney has been appointed vice president in charge of sales

Hall

Gidney

for Potash Company of America, effective Feb. 1, and will headquarter at the company's general sales office in Washington, D. C. He succeeds John W. Hall, who was named president of the firm in December.

Mr. Gidney was vice president and general manager of the former U. S. Potash Co. division of United States Borax and Chemical Corp. until his resignation last fall following the corporation's realignment into functional departments instead of divisions based on product lines. In the potash business since 1937, he is a former director of American Potash Institute and of National Plant Food Institute.

John W. Hall, whose elevation to the presidency of PCA was reported to our readers in the January issue, joined the firm ten years ago as regional sales manager. He later moved up to general sales manager, and four years ago became vice-president in charge of sales, a member of the board and of the executive committee.

He has been active in industry affairs, and is a director of American Potash Institute, a director and executive committee member of NPFI.

Mr. Hall's new post will carry him to the company's central headquarters in Denver.

Raymond Bag

R. H. Hodgson has joined the sales organization of Raymond Bag Corporation, Middleton, Ohio. He will represent Raymond in Georgia and the surrounding areas, and will make his headquarters in Atlanta.

Hodgson

Mr. Hodgson has had many years of experience in the multiwall bag business, having been associated formerly with Chemical Packaging Company of Savannah, and Union Bag-Camp Paper Corporation.

V-C

Virginia-Carolina Chemical Corporation announces two promotions in the manufacturing department of its fertilizer division.

Daniel

Stone

Philip E. Stone, formerly technical assistant, has been named assistant to the manager, and John M. Daniel, Jr., formerly section leader in research and development, becomes technical assistant to the manager.

Both are new positions. C. A. Cox, general manager of the manufacturing department, said Mr. Stone will undertake special assignments in addition to retaining responsibilities in V-C's granular fertilizer operations.

Mr. Daniel, who has directed V-C's fertilizer pilot plant in Richmond, will be responsible for technical service required by customers along with his present duties in product control.

U of Tennessee

Dr. William D. Bishop has been made State Leader of Agricultural

Bishop

Rhodes

Programs, and his post has been filled by Gilbert N. Rhodes, who thus becomes Leader of Agricultural Programs for Extension at the University of Tennessee AES.

Velsicol

The appointment of Harry A. Sidles as sales manager, agricultural chemicals division, Velsicol Chemical Corporation, has been announced by T. W. Brasfield, director of marketing.

Mr. Sidles' new responsibilities will be to plan, coordinate and execute all aspects of Velsicol's domestic agricultural sales operations. He replaces Roger W. Roth who has been appointed as assistant to the vice-president.

Spencer Chemical

Herbert A. French has been made advertising manager for agricultural chemicals and William Threadgill has become manager of agricultural market research for Spencer Chemical. Mr. French, after an

Threadgill

French

extensive career in advertising, has just joined Spencer. He will edit their quarterly house organ, "Today's Fertilizer Dealer" and supervise all advertising activities for Spencer's agricultural products, reporting to M. H. Straight, director of advertising. Mr. Threadgill joined them in 1953 and has occupied various posts since.

Smith-Douglass

M. W. Mawhinney, manager of the Smith-Douglass Streator, Illinois, plant, has announced the appointment of Donald B. Moen, Craig R. Robinson and C. Paul Davis as Illinois salesmen for the company.

Moen

Mr. Moen will serve Smith-

Robinson

Davis

Douglass dealers in Livingston, Woodford, McLean and Tasewell counties. Craig R. Robinson will service dealers in Kankakee, Will, Dupage, Cook and Kane counties. C. Paul Davis will service dealers in Iroquois, Ford, Vermillion, Champaign and Piatt counties.

Wilson

Louis H. Wilson, secretary and director of information of the National Plant Food Institute, was reelected as a member of the Board of Directors, National Farm-City Committee, Incorporated, at its annual meeting held in Chicago.

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*Trade Mark

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Bemis

Bemis Bro. Bag Company has announced the retirement of two vice-president-directors, H. P. Claussen of the company's Boston offices, and R. M. Hersey, of the Bemis offices in Minneapolis. The retirements of the executives were effective January 31.

Mr. Claussen, vice-president—procurement and materials — joined Bemis in 1916. Mr. Hersey, vice-president and sales director for national accounts, came to Bemis in 1914.

H. J. Coyne, Jr. and B. E. Rogan have been made field sales supervisors for Bemis Bro. Bag Co., according to an announcement by sales manager L. W. Chenault. They will serve the Texas and New Mexico territories. Mr. Coyne joined up in 1950; Mr. Rogan in 1948.

APC

Dr. Howard E. Kremers has been appointed district manager of market development for American Potash & Chemical Corporation it was announced by J. N. Hinyard, director of market development.

Dr. Kremers previously was manager of market development for the company's Lindsay Division.

Hayes-Sammons

Edward H. Metz has been named controller of Hayes-Sammons Chemical Co. with headquarters in Mission, Texas, according to Thomas B. Sammons, Jr., president.

obituaries

Nathan Ebenezer Gaston, 69, secretary-treasurer and manager of Gulfport Fertilizer Company for the past 13 years, died January 18 at Gulfport, Miss.

Dr. Frederick G. Merkle, professor emeritus of soil technology, Penn State, died January 6.

Emilio Viale, 38, Hercules entomologist and head of their crop chemical field work, died of a heart attack December 23, in Wilmington.

Holland R. Wemple, 68, Texas Gulf Sulphur retired vice-president and salesmanager, died December 27.

USDA says American agriculture is in the midst of a technological revolution that will transform it into one of the higher capital-using industries in the country.

The International Scene

AUSTRALIA

Ammonia Curtailed; Sulphuric Acid Stimulated

The Government-owned synthetic ammonia plants, because of the expansion of private enterprise, are being curtailed. The Mulwala plant is retained; the Albion plant is kept as reserve capacity. Other plants are for sale, or already sold.

On the other hand, the bounty on sulphuric acid production was extended through June of this year. This is payable on acid made in Australia from pyrites, lead sinter gas and sold for delivery in Australia or used in the production of any commodity.

BELGIUM

N Remains Leading Export

Nitrogenous fertilizers in 1958 regained their 1956 place as the industry's principal export. Other sectors showing increases despite the recession were phosphatic fertilizers, which made the largest percentage gain; potassic fertilizers; organic chemicals.

The fertilizer industry accounted for the largest increases. Nitrogenous materials increased 38 percent in tonnage and 30 percent in value; phosphatic and potassic fertilizers increased 47 percent and 19 percent, respectively, in volume. Both increased 19 percent in value.

BRAZIL

Fertilizer Production Up

Production of fertilizers shows an uptrend, and continued expansion is foreseen. In 1958, output consisted of 146,000 metric tons of phosphate rock, 130,000 tons of superphosphates, 4,600 tons of ammonium sulfate, 7,950 tons of ammonium nitrate dolomite mixture (nitrocalcio), and 35,000 tons of organic waste materials. However, 1958 imports, 426,000 tons, still accounted for a large proportion of the total supply.

Of the phosphate rock produced, 82,000 tons were consumed in preparation of superphosphates. Production of phosphate rock in the northern area of Pernambuco, which accounts for about 75 percent of the total, was doubled in 1958, and plans call for another twofold expansion in 1959. Six plants are currently producing superphosphates. The largest of these is to be expanded by 50 percent in 1959, and a new company has been organized to manufacture triple superphosphate by 1960.

Ammonia now being made for use in nitrocalcio is scheduled for a 100-percent increase. A new plant to produce ammonia, ammonium nitrate, calcium nitrate, and urea is planned for completion by 1962 at Aratu, Bahia. Japanese interests are negotiating for the establishment of a nitrogenous fertilizer plant at Recife.

BRITAIN

A Difficult Year

Quote from a stockholder report: "Last year's extremely difficult conditions in our main selling areas were responsible for a reduction in fertiliser sales. This from London. From Scotland a similar report said: "Total sales of all classes of fertiliser in the year to September 30 were slightly less than for the previous year, but the level of the year's sales indicates the rising trend is continuing."

COMMUNIST CHINA

Importing from Morocco

The new China News Agency reports that Communist China will import half-a-million tons of phosphate rock from Morocco. The contract, included in the Sino-Morocco trade agreement of last October, was signed between the China National Metals Corporation and the Cherifien Office of Phosphates of Morocco—Hong Kong.

EL SALVADOR

Tentative Plant Plans

Construction of a fertilizer plant is under active study by the Salvadoran Government production agency, Instituto de Fomento de la Produccion. The economic feasibility of such a plant depends partly on whether the fertilizer prices would be competitive on the world market. Because El Salvador is a major fertilizer consumer in Central America, there is considerable interest in such a plant. Financing plans are not definite, but consideration is being given to issuance of a minimum of 50 percent of the stock to local investors and the remainder to foreign investors. The plant, tentatively planned to be located at the port of Ocajutla, would produce ammonia, ammonium sulfate, urea, ammonium nitrate, diammonium phosphate, and superphosphate. If the phosphatic materials are made, sulfuric acid and phosphoric acid plants may also be constructed. El Salvodoran imports of fertilizers in 1958 consisted of 59,862 short tons of mixed fertliizers and 58,296 tons of materials.

FRANCE

Rich Sulphur Source Opened

France can expect to become the world's third largest source of sulphur as a result of the recovery operation being undertaken by Societe Francaise des Petroles in the Lacq natural gas fields in Southern France.

Current planning puts the annual recovery at 1.2 million tons of sulphur. This compares with French consumption of a quarter million tons of raw sulphur imported annually, plus about the same tonnage recovered from imported pyrites. The Lacq production will be available from 1962.

FRENCH TOGOLAND

Phosphate Rock Mining Soon

The Compagnie Togolaise des Mines du Benin, formerly known as Societe Miniere du Benin, has been preparing for the last 5 years to exploit phosphate rock deposits in southern Togo, but has been delayed because of the necessity of assuring investors that the company was financially sound and capable of undertaking phosphate rock mining in an undeveloped country. Work on a railway between the mine and port (20 kilometers) and construction of a washing mill are actively underway. Actual mining at the rate of 50,000 tons per month is expected to begin in the last quarter of 1960. The annual production rate will be gradually increased to 960,000 tons of crude phosphates equivalent to 600,000 tons of marketable product.

NEW ZEALAND

Study of Phosphate Quality

A major project being undertaken by the New Zealand Manufacturers Research Association is to gauge comparative performance of the rock phosphates available to New Zealand and used in the manufacture of superphosphate, and then to view that data against a background of what has already been determined for rock phosphates available to the superphosphate industry in Europe. In addition to other benefits, this basic information will enable the manufacturers in New Zealand, if forced by circumstances to modify their procedures, to know more surely what effect any deviation will have on their products. The project has now passed from the laboratory stage to pilot scale trials in the works.

SAUDI ARABIA

Wants Petrochemical Plants

The director of oil and mining—Sheikh Abdullah El Tariki—is reported as saying the Government is urging oil companies to create a petrochemical industry in Saudi Arabia, and is negotiating with foreign firms for this purpose.

Farm Aviation Has International Center

There was established July 1958 the European Agricultural Aviation Centre, an independent non-profit organization for the promotion of the use of aircraft and helicopters in agriculture and forestry. We have received from them the 4th quarterly issue of a publication called "Agricultural Aviation" which would be of interest to anyone using aircraft for plant food application.

Subscription rates in the US and Canada are $3.50 a year, and the publication headquarters is at le v. d. Boschstratt 4, the Hague, Netherlands.

International Horticulture Show, Rotterdam

The International Horticultural Exhibition known as Floriade will be held in Rotterdam, March 25 to September 25, 1960—and for the first time American horticulture will be represented as a result of cooperation between USDA and the American Horticultural Council. This is an elaborate show, so extensive that overhead cable cars are used and a 416 foot tower with 3 restaurants in it so the public may view from above, and the gardens are all lighted at night. All sorts of gardens are arranged. More than $4,000,000 has been invested by Netherlands concerns, the Government and the City of Rotterdam.

CHANGES

Ris-Van Merges With Stepan

Kenneth Van Duzer, president of Ris-Van, Inc., liquid fertilizer manufacturer headquartered at Belmond, Iowa, has announced that the firm has merged with the Stepan Chemical Co. of Chicago, Ill. He said there will be no changes in personnel and that rapid expansion of Ris-Van is anticipated. The firm has plants at Belmond, West Union and Sanborn, Iowa and at Blue Earth, Minn. Ris-Van also recently acquired the Davis Liquid Fertilizer Co. at Vinton, Iowa.

Consolidated Buys St. Regis Canadian Facilities

Consolidated Paper Corp., Montreal, Canada has acquired all of the Canadian facilities for multiwall bag and packaging system manufacturing from St. Regis Paper, New York. A new company, St. Regis-Consolidated Packaging Ltd. will be set up by Consolidated to carry on operations in Vancouver, B. C.; Dryden, Ont.; St. Lambert and Cap de la Madelaine, Que.

Buell Acquires Northern Blower

Buell Engineering Company, Inc., one of the nation's leading producers of electrical and mechanical dust collecting equipment has purchased the 49 year-old Northern Blower Company of Cleveland, Ohio according to J. A. McBride, president.

Under terms of the acquisition, L. A. Eiben, son of the founder, will operate the Northern Blower Division of Buell as a vice president within the framework of the Buell organization. Norblo manufacturers bag-type dust collectors and filtering equipment.

According to Mr. McBride, "With the acquisition of Norblo, Buell will be able to offer its customers a complete range of products and systems to handle every industrial dust or air-pollution problem." The company's line of equipment now includes cyclones, electric precipitators, low-draft loss and bag-type collectors. In addition, Buell will continue to produce centrifugal and gravitational dust classifying systems.

West Virginia Pulp Closes Dallas Office

To expedite shipments and improve customer service, West Virginia Pulp and Paper is now processing all orders for multiwall bags formerly handled by the Dallas office, directly through the New Orleans Bag Plant of its Multiwall Bag Division.

As a result of this move, the company's Dallas office has been closed. Sales representatives previously working out of this office, will continue to cover the states of Texas, New Mexico and Oklahoma as heretofore, providing customers with more efficient service.

These representatives are located in Texas and include H. D. Laney of Fort Worth, J. A. Schoenstein of Houston, A. M. Strickland of Lubbock and O. E. Wilson of Richardson.

The company's Multiwall Bag Division operates four bag plants located in New Orleans, Torrance, Calif., St. Louis, Mo., and Wellsburg, West Virginia.

Sole Chemical Expands

Sole Chemical Corporation — Chicago producer of surface active chemicals, announced that as of February 1, 1960, its new and larger headquarters will be located at 7740 South Chicago Avenue, Chicago 19, Illinois.

Solomon Epstein, president, explained that this move will greatly expand their manufacturing facilities, as well as improve the coordinating effort of their laboratories, warehousing, and offices for a more efficient customer service.

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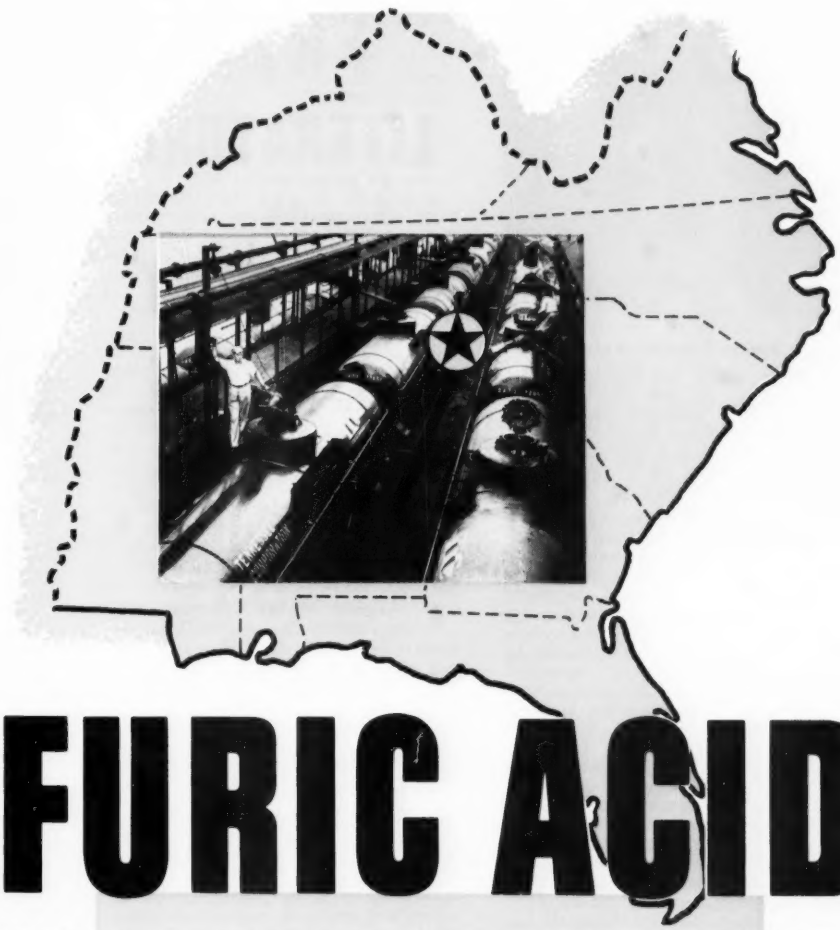

SULFURIC ACID

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STRENGTHS

Whether your Sulfuric Acid requirements are an occasional tank car or large tonnages, check with **Tennessee** before making your decision. You will find our acid attractively priced, high in quality, consistently available and backed by outstanding customer service gained through years of growth and experience.

Our complete control of raw materials from mine to finished product allows our total independence from elemental sulfur and enables **Tennessee Corporation** to accommodate and ship large tonnages of acid quickly and with minimum notice.

The sulfur contained in the ore we process yields Virgin Sulfuric Acid of highest quality free from organic matter, very low in iron, and in no way contaminated from regenerated or spent sulfuric acid sources.

TENNESSEE COPPER COMPANY, COPPERHILL, TENNESSEE DIVISION TENNESSEE CORPORATION,
produces all commercial grades and strengths of Sulfuric Acid from 60° Baume through the various Oleums.

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TENNESSEE CORPORATION

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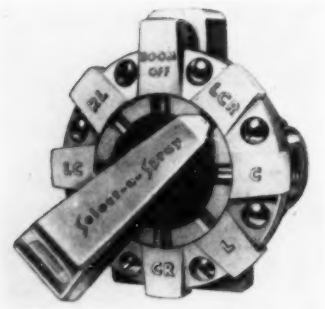
617-629 Grant Building, Atlanta 3, Georgia

FREE LITERATURE ON EQUIPMENT MATERIALS AND SUPPLIES



Boom Control Valve

A new boom control valve for pressures up to 300 psi has been added to the product line of the Delavan Manufacturing Company, and is being marketed under the trade designation of Delavan 9000 Series Select-A-Spray.

The manufacturer says the operating principle of Delavan's Select-A-Spray has not been changed. The face plate was restyled and positive settings added to each of the eight spraying positions; the handle incorporates a spring for easier operation in the field and is larger to provide additional hand leverage. The valve can still be serviced in the field without removing it from the sprayer, they state.

Select-A-Spray will be available in four models to fit all inlet, bypass and outlet requirements. It comes with two cap screws for simple, sturdy mounting to the spray rig and is furnished with an accessory outlet which is fitted with a plug for those cases where the outlet is not required.

For catalogs on the new boom control valve, circle number 1 on CF's Information Service Bureau card, page 49.

Corrosive Service Rotameters

New Bulletin #150, now ready for distribution, gives details of materials used in manufacturing rotameters for corrosive applications. Various types of meter designs which have been proved in the field are illustrated and described in detail by Brooks Rotameter Company.

For a copy, circle number 2 on CF's Information Service Bureau card, page 49.

Portable Air Compressors

Announcement has just been made of a complete line of portable, oil-free, piston-type air compressors (air pumps) by the Winslow Manufacturing Corporation.

The design of these compressors insures maintenance-free operation by eliminating lubrication and diaphragms that rupture. The non-lubricated piston includes a specially compounded Teflon cup backed up by a silicone O-ring. Cylinder liner is made from corrosion proof and wear resistant 304 stainless steel. Aluminum alloy ball seating against silicone in the check valve insures long life under adverse conditions.

For further information, circle number 3 on CF's Information Service Bureau card, page 49.

Liquid Meter Catalog

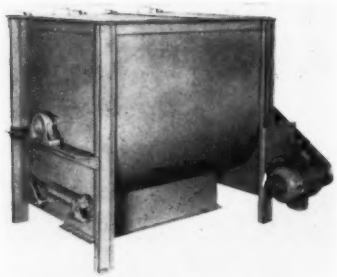
A two-color, 20-page bulletin on their line of Niagara Meters is being offered by Buffalo Meter Company. Bulletin 43 covers a broad range of principles, types of meters, applications, and related data.

For a free copy, circle number 4 on CF's Information Service Bureau card, page 49.

Stainless Loading Assemblies

New loading assemblies in stainless steel are now available from OPW Jordan. Used widely in industry for bulk loading or unloading wherever products require stainless steel piping and stainless steel swivel joints, the loading assemblies are pre-engineered facilities designed to speed loading or unloading operations. The stainless steel loading assembly utilizes Series 7400 stainless steel swivel joints and stainless steel piping, with spring balance style in 2½", 3" and 4" sizes, and counter weight style in 2", 2½", 3" and 4" sizes.

Complete engineering information, dimensional drawings, and prices are shown in SRBc 68-59, which can be obtained by circling number 5 on CF's Information Service Bureau card, page 49.



New Ribbon Blender

A new ribbon blender, claimed to be the 'low cost answer to most mixing problems' has been engineered and is now marketed by Munson Mill Machinery Co.

The new blenders give 20 to 200 cubic feet of the most thorough blend obtainable, according to Munson engineers. Other features cited include a wide range of capacities, elimination of contamination, controlled agitation, maintenance-free operation and low power requirements.

The all-welded, heavy duty tub is equipped with externally adjusted packing glands, while the agitator is a reversing double spiral ribbon supported on heavy duty outboard bearings.

Standard model has mild steel tub featuring gasketed and bolted top covers with a hinged panel in the cover for easy access to interior for cleaning. The center discharge in this construction is with either drop bottom gate or a paddle gate.

For more detailed information on the ribbon blender, circle number 6 on CF's Information Service Bureau card, page 49.

Spherical Roller Bearings

Link-Belt Company's new line of highest capacity spherical roller bearings is described in complete detail in its comprehensive new 52-page Book No. 2760. The new spherical bearings combine three features: maximum diameter and quantity of convex rollers for each bearing size; precision machined centrifugally-cast bronze retainers and high, heavy inner race shoulders.

The illustrated book describes all design features, including comprehensive selection data and formulae, shaft bearing seat diameters, lubrication information, shaft details and bearing load ratings, diagrams, photographs and charts.

A copy of Book 2760, "Spherical Roller Bearings and Pillow Blocks" may be obtained by circling number 7 on CF's Information Service Bureau card, page 49.

Process Equipment Brochure

A new 12-page brochure (S.A1133) describing equipment, processes and services for the chemical processing industry is now available from De Laval Separator Company.

The equipment illustrated and described includes centrifuges, plate heat exchangers, screens and laboratory devices.

For your copy, circle number 8 on CF's Information Service Bureau card, page 49.

Rotameter Selector Aid

A functional bulletin #110, now ready for distribution, shows the full, integrated Brooks line of rotameters. It states the basic advantages of variable area flow meters and displays the various types of meters in their specific areas of application. This in turn is tied into a logical development of accessories which make the rotameter adaptable to modern instrumentation.

Copies are available by circling number 9 on CF's Information Service Bureau card, page 49.

New Proportioning Pump

A new, low cost, electrically-driven Chem-O-Feeder for the accurate proportioning of concentrated corrosive chemicals has been announced by B-I-F Industries, Inc.

The diaphragm-type pump, Model 1331 Proportioneers Chem-O-Feeder, is made of corrosion-resistant materials and will effectively meter such chemicals as 66 degree Baume sulfuric acid, sodium hydroxide, phosphoric acid, hydrofluosilicic acid, etc. Featuring adjustable stroke length while in motion, the pump is ideal for the chemical field and general industry.

The positive displacement pump is easily installed, either floor, shelf or wall-mounted, and takes suction directly from the shipping container. Range is over 4 to 1 with capacity up to .7 GPH into discharge pressures up to 100 PSIG. Complete package ready for installation consists of the pump, foot valve, injection nozzle, connecting hoses and instructions.

For additional information on the Model 1331 Chem-O-Feeder, circle number 10 on CF's Information Service Bureau card, page 49.

Plant Lab Specifications

If you are losing profits by over-enriching your product, just to insure meeting quality standards, Will Corporation suggests setting up a small laboratory in your plant to check quality quickly and precisely.

To show how inexpensive such a quality control lab would be, they have compiled a list, complete with prices, of all of the apparatus and chemicals needed to run tests for moisture content, total nitrogen, total phosphate, insoluble phosphate, free phosphoric acid, and soluble potash. This 6-test control laboratory is designed to pay for itself quickly for the fertilizer manufacturer producing 25,000 to 50,000 tons a year.

For your free copy of this "Guide for Small Fertilizer Plant Control Laboratory," circle number 11 on CF's Information Service Bureau card, page 49.

Compact 'Canned' Pump

A new low-cost, compact, leak-proof pump for commercial and industrial use has been developed by Dynapump Division of Fostoria Corporation. The new unit, Dynapump Model 670 E, will handle up to 1500 gpm, producing heads up to 20 feet. All wetted metal parts are stainless steel. Since rotor, shaft and impeller form a single assembly enclosed or "canned" in a stainless steel cylinder, there is no stuffing box or mechanical seal. The pumped fluid circulates in the rotor chamber and acts as bearing lubricant and motor coolant. No external lubrication is ever required. Dynapump Model 670 E is suitable for pressures to 150 psi and temperatures to 220 F. It is available for operation on either 115 or 220 volts, single phase, 50 or 60 cycles. Automatic overload protection is provided.

For more information, circle number 12 on CF's Information Service Bureau card, page 49.

Rubber Storage Tanks

United States Rubber Company's Transportation Products Department has introduced a line of pillow-type static storage tanks for liquid fertilizer storage, in a wide range of stock capacities from 900 to 50,000 gallons, and even higher on special order. The units are constructed of tough, lightweight, flexible rubberized fabric and designed for use on the ground under all weather conditions. Stability is assured by a filed width to height ratio of more than 2½ to 1. Empty, they collapse to a flat envelope and can be rolled into a small package. Each unit is equipped with a 10" x 16" manhole cover with a 4" nipple and a vent and flame arrester.

For a free copy of bulletin SS-100 and descriptive folder, circle number 13 on CF's Information Service Bureau card, page 49.

Vibrating Coolers, Dryers

Catalog 953 is a comprehensive 32-page book covering electric and mechanical vibrating type coolers and dryers of both the direct and indirect type. It includes sections on basic drying principles and the TMV variable amplitude unit. Pages are also devoted to auxiliary equipment in the vibrating line such as feeders, conveyors, magnetic separators, packers, controls and the 'Waytrol' constant weight feeder. A pilot unit rental system is outlined, permitting firms to simulate actual production conditions in their own plant. Abundant use of drawings, photographs and specifications as well as material weight charts are included.

For your copy, circle number 14 on CF's Information Service card, page 49.

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1-60

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Belt (Stream) Weigher

A pneumatically-operated belt (stream) weigher for the continuous weighing of dry materials at low to medium rates is the subject of a new bulletin by Omega division of B-I-F Industries, Inc.

The Omega Pneu-Weigh, Model 36-20W, is ideal for continuous process feed, fertilizer chemical plants — wherever accurate and dependable measurement and control of flow of dry materials is important. It has a wide range of 10:1 with constant speed drive and 50:1 with variable speed Belt drive, and a capacity of 0 to 3000 lbs. per minute. A simple pneumatic sensing device makes the feeder easily adaptable for recording, pacing and controlling other equipment.

The two-color, two-page bulletin contains a photograph of the Pneu-Weigh, lists its advantages, describes its operation and accessories. A detailed dimension drawing is also included.

For a copy of Bulletin Ref. No. 36-20.1, circle Number 15 on CF's Information Service card, page 49.

Product Lines Bulletin

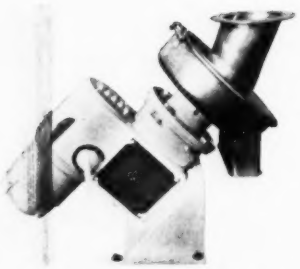
Equipment for the process industries is described in a comprehensive new 12-page, two-color bulletin offered by Fuller Co., a subsidiary of General American Transportation Corp.

The new bulletin, G-3C, discusses applications and performance characteristics of Fuller-Kinyon pumps, Airveyor® pneumatic conveyors, Fuller-Huron Airslide® fluidizing conveyors, rotary compressors and vacuum pumps, horizontal-grate coolers, Fuller-Humboldt suspension-type preheaters, Sutorbilt positive pressure blowers and gas pumps, and Lehigh induced draft fans. Operating principles are explained, and photographs show typical installations.

Fuller equipment is used for: pneumatic conveying of dry granular and pulverized materials; plant air supply and vacuum service; and (4) handling of combustion products.

Thirty-one photographs, six drawings, twelve schematic illustrations and seven tables of dimensions and capacities supplement the text material.

For copies of Bulletin G-3C, circle number 16 on CF's Information Service Bureau card, page 49.



New Angle Disintegrator

Rietz Manufacturing Company has introduced a new, low cost, high capacity Angle Disintegrator for batch or continuous grinding, mixing, blending and dry granulating. The new RP Model is exceptionally compact, with rotor direct-connected to a variable speed motor, eliminating the need for belts and costly belt replacement down time.

The Rietz RP Model is adaptable to many uses. As a dry granulator, maximum uniformity of granules and minimum generation of fines due to centrifugal attrition is achieved by variable speed control and the use of interchangeable 360 screens that also substantially reduce temperature rise of the product. Ease of changing the speed and screen size quickly adapts the unit to the process operations of grinding, mixing and blending of a wide variety of wet or dry materials. For operations that do not require variable speed control, single-speed drive RP Models are available at even lower cost.

The machine, available in three sizes of stainless steel construction, opens fully for fast and thorough cleaning of all parts.

Full information on the Rietz RP series of Disintegrators is available by circling number 17 on CF's Information Service card, page 49.

Lead-Surfaced Base Metals

The 'Insmetals' (international shielding metals), a new family of lead-surfaced base metals, are the subject of a 16-page technical data release by Knapp Mills Inc.

During 13 years of development Insmetals have been used in fabrication of more than 50,000 tons of equipment prototypes, shielded against corrosives, radioactive corrosives or radiation, throughout the chemical process and nuclear industries of the United States, Canada and Europe.

The release tells of the properties, characteristics and uses of: lead-surfaced aluminum, lead-surfaced copper, lead-surfaced carbon steel, lead-surfaced stainless steel and lead-surfaced stainless clad steel.

For a free copy, circle number 18 on CF's Information Service card, page 49.

Ventilating Equipment Bulletin

New bulletin describes Heil rigid vinyl and reinforced plastic collecting hoods, ducts and stacks, elbows and other fittings; includes listing of standard sizes, specifications and chemical resistance data. Enables purchasers to lay out a completely corrosion resistant system for handling corrosive fumes—using standard parts—and install the equipment with their own maintenance men or a local contractor.

To obtain a copy, circle number 19 on CF's Information Service Bureau card, page 49.

Filler, Filteraid Fact Sheet

The Dicalite Department of Great Lakes Carbon Corporation has issued a two-page sheet entitled 'Facts on Filteraids and Fillers' that describes diatomite and perlite fillers and filteraids, the use of diatomite as insulation and diatomite-asbestos and carbon-based filteraids. A graphic table permits quick and ready comparison of the various types in terms of specific gravity, particle size, color, moisture absorption and other factors.

Shown in chart form are the flow-rate characteristics of eight standard grades of diatomite, one of perlite and one of carbon. In another chart, the sizes of particles removed from a liquid by five grades of diatomite filteraid are indicated. Characteristics are shown for diatomite in both its uncalcined form and its calcined and process-calcined forms. Special-process perlite characteristics are indicated, as well as characteristics for carbon-based fillers.

Copies are available by circling number 20 on CF's Information Service Bureau card, page 49.

Sight Glass Indicator

Now available in aluminum from OPW-Jordan is Model 640 Visi-Flo Sight Glass Indicator. Used in gravity flow applications as a window in a pipeline, it indicates direction, viscosity, color, clarity, rate of flow and purity. Easily handling entrained solids, gasoline, oil, water or chemicals, it protects against costly line stoppages. Model 640 is a straight-through type with double windows of heavy plate glass on opposite sides with leak-proof gaskets. Available in ½" through 2" sizes, it is suitable for pressures to 75 psi, temperatures to 225°F.

Complete information, dimensions, illustrations and engineering data in 4-page Bulletin F-6 can be obtained by circling Number 21 on CF's Information Service card, page 49.

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Information Service Bureau

Commercial Fertilizer and Plant Food Industry

75 Third Street, N. W.

Atlanta 8, Georgia

Familiar face in Midwest fertilizer plants: U.S.I.'s Field Service Engineer Tom Martin checks granulation of product at Federal Fertilizer Co. plant in Danville, Ill.

Here's U.S.I.'s Tom Martin . . .

LOOKING FOR WORK IN YOUR PLANT

Tom Martin is U.S.I.'s Senior Field Service Engineer covering fertilizer manufacturers in the Midwest. His job: To help customers make the most efficient use of U.S.I.'s Ammonia, Nitrogen Solutions, Sulfuric Acid and Phosphatic Fertilizer Solutions (wet process phosphoric acid).

Tom knows materials, processes, equipment, formulations, costs. He'd like to put his knowledge and experience to work in your plant.

Why not get in touch with him? He's available for trouble shooting on any immediate production problem you may have. Tom will also help you calculate optimum formulations . . . suggest equipment . . . determine whether — and how — you can cut costs. He'll work with you setting up trial runs, and lend a hand until production is running smoothly.

If this U.S.I. service would be valuable in your operations, you can contact Tom Martin through our New York Sales Office. Write or phone collect. The number is OXford 7-0700.

U.S.I. INDUSTRIAL CHEMICALS CO.
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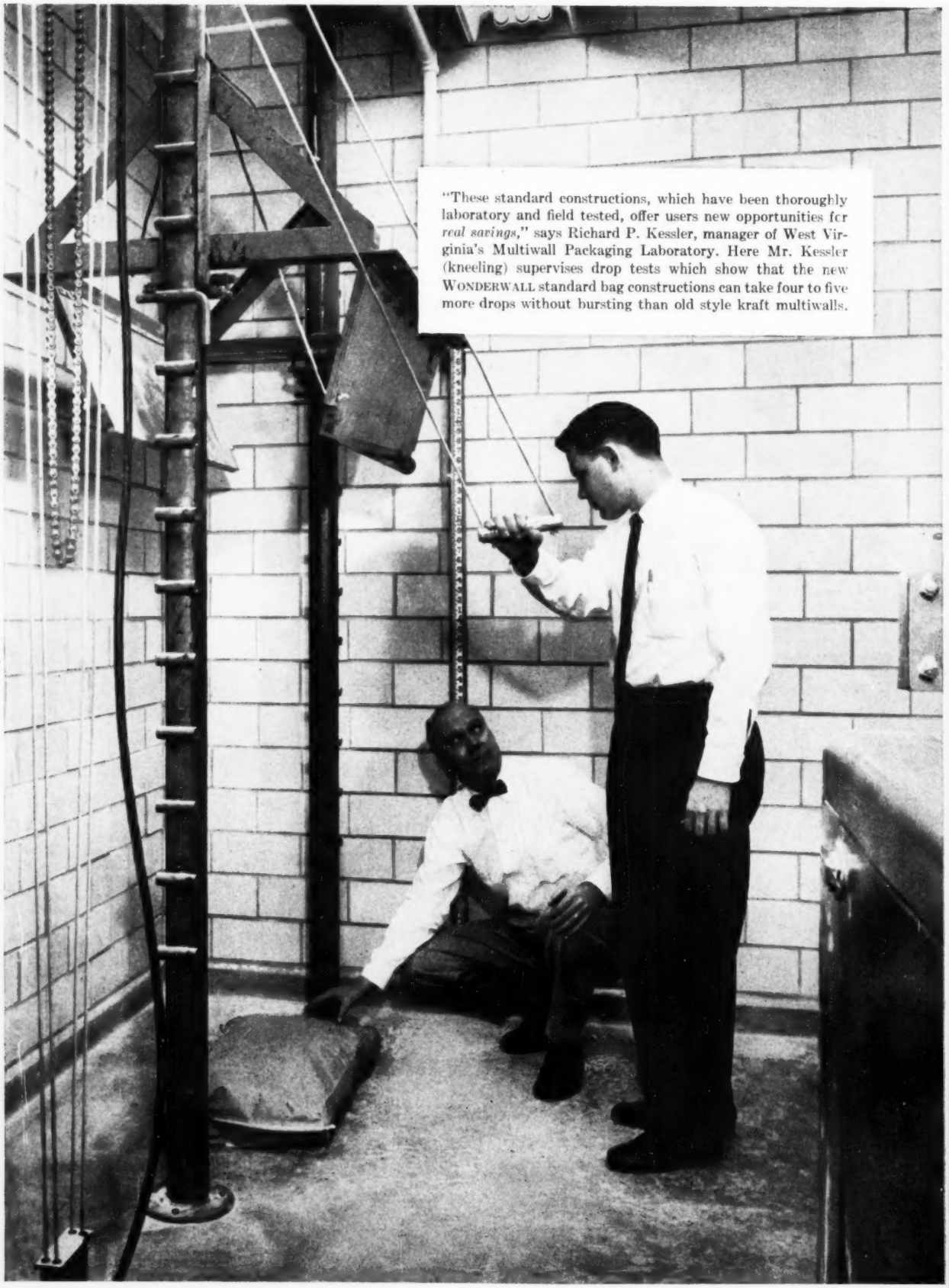

"These standard constructions, which have been thoroughly laboratory and field tested, offer users new opportunities for *real savings*," says Richard P. Kessler, manager of West Virginia's Multiwall Packaging Laboratory. Here Mr. Kessler (kneeling) supervises drop tests which show that the new WONDERWALL standard bag constructions can take four to five more drops without bursting than old style kraft multiwalls.

NEW!

WEST VIRGINIA'S 1960 STANDARD BAG CONSTRUCTIONS TO SAVE YOU MONEY

Major savings for fertilizer packers are being achieved by three new standard WONDERWALL bag constructions perfected by West Virginia.

During a controlled test to determine possible savings in bag costs, various WONDERWALL constructions were developed in our Multiwall Packaging Laboratory. They were tested by 101 packers who shipped 569,224 tons of fertilizer in 12,307,546 WONDERWALLS.

The three recommended standard constructions and their actual savings, as used in normal conditions, are shown in the box.

For example, where a typical 100# old fashioned kraft bag usually would require 1/90 AL, 2/40, 1/50 for a total of *four* plies, the new standard WONDERWALL provides the same or superior strength with *three* plies: 1/100 AL, 1/40, 1/50 . . . at a saving of $3.50 per M.

Secret of WONDERWALL's strength is Kraftsman Clupak*, the paper with the built-in stretch that withstands far more impact without breaking than conventional natural kraft multiwalls. In a WONDERWALL bag, fewer plies are needed to do the job!

See how WONDERWALL standard bag constructions can *cut your costs, increase your profits.* Our technical service experts are ready to help you take full advantage of these new bag developments; call or write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Ave., New York 17, N.Y.

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority.*

West Virginia Pulp and Paper

NEW STANDARD WONDERWALL FERTILIZER BAG CONSTRUCTIONS

Pounds Packed	Old Style Natural Kraft Construction	New Wonderwall	Actual User Savings
100#	1/90AL, 2/40, 1/50	1/100AL, 1/40, 1/50	**$3.50/M**
80#	1/90AL, 2/40, 1/50	1/100AL, 1/40, 1/50	**$3.10/M**
50#	1/90AL, 1/40, 1/50	1/100AL, 1/60	**$3.80/M**

Smith-Douglass Co., Inc., Norfolk, Va., has shipped over 50,000 tons of fertilizer and related products in a million new WONDERWALL 100# standard construction bags. They report excellent results with a saving of $3.50 per M and reduced bag breakage.

CROP CHEMICALS

PESTICIDES NEWS OF INTEREST
TO FERTILIZER MANUFACTURERS

Food and Drug Orders Zero Heptachlor Tolerance

The Food and Drug order showing a zero tolerance for heptachlor and heptachlor epoxide may herald a new era for the agricultural chemical industry and is causing much concern at all levels of agriculture.

This is believed to be the first time that Food and Drug has established a tolerance on a conversion product in addition to the pesticide chemical applied, and industry attorneys are studying the order since many aspects are not clear.

In the meantime, Velsicol Chemical Corp., heptachlor's producer, has pointed out that the zero tolerance will not affect all uses of the chemical. The action covers only raw agricultural commodities moving in inter-state commerce. Many uses of heptachlor result in no residues in food and will not be affected by the order. Velsicol is working with the government agencies concerned to establish these uses, and reports that experimental programs are underway to establish realistic tolerances. Analyses of certain crops already indicate that adequate tolerances can be issued.

Absence of hazard was indicated by Food and Drug's statement that "On the basis of the available evidence the situation does not call for any action against crops already treated in accordance with label directions registered with the U.S. Department of Agriculture and containing heptachlor residues within the original legal tolerances of 0.1 parts per million."

In effect, if a crop harvested in the 1960 season contains a residue up to 0.1 parts per million of heptachlor, it is cleared for use provided that the residue resulted from a treatment applied on or before January 18. The same residue resulting from the same treatment applied January 20 would not be considered clear.

Heptachlor was one of the first chemicals to be granted a tolerance under provisions of the Pesticide Residue Amendment, and it has been effectively used to protect grain, forage, fruits and vegetables from insect damage for many years. The Department of Agriculture chose heptachlor as the most effective and economical chemical to eradicate the fire ant throughout the South. It also has been used by the Department of Agriculture to protect against ravages of grasshoppers in the Western and Great Plains states and in control programs against the Japanese and white fringed beetles.

In Food and Drug's statement concerning their new order, they point out that "no residues of heptachlor itself have been found in meat or milk." Food and Drug also have stated that in recent tests of commercial milk samples, no residues of heptachlor epoxide were reported.

The language in the FDA order as well as its press release indicates that Food and Drug recognizes that residues of heptachlor are such that adequate tolerances can be established.

Non-food uses are not affected, including protection of turf, recreational areas, road sides, tobacco, nursery stocks, and ornamentals. Also such uses as the control of termites, fire ants, grasshoppers, European chafers, Japanese and white fringed beetles, etc., would not be affected when applications are made on land not used for production of food or forage.

Arizona Agro Phosphate Adds Crop Chemicals

Arizona Agro Phosphate Co., 5420 West Bethany Home, Phenix, Ariz., a division of the Wilbur-Ellis Co., San Francisco, has announced the manufacture of insecticides has now been added to its production of fertilizers, also plant expansion.

Raymond Laine, manager, said the 11,000-square-foot building now under construction on the 8½-acre site, with machinery, will represent an investment of some $100,000. It will also add about 10 people to the staff of 35.

Mr. Laine said the firm also will package fertilizers for the home owner as well as for agriculture and will produce insecticides for both these markets.

Commercial Solvents Adds 'Silotracin' for Silage

A major new use for antibiotics, the preservation of forage, is emphasized with the announcement by Commercial Solvents Corporation of a new product called 'Silotracin,' which prevents the spoilage of silage.

The active ingredient of Silotracin is zinc bacitracin, an antibiotic which is widely used as a pharmaceutical for human use, as a veterinary medicine, and as a health and growth factor in animal and poultry feeds. According to I. Roy Cohen, manager of Commercial Solvents' Department of Animal Nutrition, through which Silotracin will be marketed, this is the first time that an antibiotic used for human and animal health also has found application in the preservation of harvested forage crops.

Silotracin was developed at Commercial Solvents' research center in Terre Haute, Indiana. For the past three years, the antibiotic has undergone extensive field testing throughout the United States.

Experiments at a number of agricultural colleges and experiment stations have shown that the addition of Silotracin in small quantities to the contents of farm silos insures the palatable preservation of silage, particularly grass silage, by selectively discouraging the bacteria which make poor quality silage, and by encouraging the bacterial action which preserves silage nutritional value. When the Silotracin-treated feed is removed from the silo, no trace of the antibiotic remains.

'Thiodan' Granted Approval For New Insects and Crops

U. S. Department of Agriculture has approved label claims for Thiodan® insecticide, which now include control of four more potato pests and, for the first time, the chemical can be used to control Mexican bean beetle on all types of beans. In addition, it is approved for use to combat aphids on melons, cucumbers, summer squash, and winter squash.

Produced by Niagara Chemical Division of Food Machinery and Chemical Corporation, Thiodan is already approved for use on potatoes in the control of aphids, leafhopper, fleabeetle, and Colorado potato beetle. Now its use has been extended to include the potato tuberworm and the leaf-eating Southern armyworm, green stink bug, and leaf-footed plant bug.

Chemical Engineers to Hear Pesticides Papers

The 42nd annual meeting of the American Institute of Chemical Engineers will be held at the Hotel Biltmore, Atlanta, Ga., February 21-24. The Chairman of Area of Interest, G. L. Bridger, W. R. Grace & Co. research center, has announced that the symposium chairman will be D. J. Porter, Diamond Alkali Co.; vice-chairman, C. T. Nixon, Ashcraft-Wilkinson. Publicity chairman is G. A. Howland, Tennessee Corporation.

In addition to the pesticides subjects, A. V. Slack of TVA's division of chemical development will talk on the **Status of Liquid Mixed Fertilizer Technology.** This is scheduled for February 23 at 3.15 P.M.

The pesticides program includes:

The Pesticide Business, J. V. Vernon, Food Machinery & Chemical Corporation; **History of DDT,** J. G. Plowden, Geigy Agricultural Chemicals; **The Technology of Pesticide Manufacture,** H. R. Moody, Rohm & Haas Company; **Industrial Hygiene,** W. R. Bradley, American Cyanamid Company; **The Formulation of Pesticides,** S. H. McAllister, Shell Chemical Corporation; **Distribution,** L. J. Polite, Jr., Diamond Alkali Company. **Registration** $6; ladies $3.00.

What is a "Farm"?

For the past 10 years government statistics have clouded the income status of farmers by counting as farms hundreds of thousands of units which really weren't farms in any business sense. Every piece of property of three acres or more which produced $150 a year in agricultural products, was classed as a farm and any such producer was counted as a farmer, whether or not he sold any of his products.

Now the Census Bureau has changed its definition. A farmer must have 10 acres and **sell** $50 a year in farm products. This is an average of less than 14 cents a day. A person owning less than 10 acres will be counted as a farmer only if he shows sales of $150 a year in farm products, an average of about 41 cents a day.

As a result of this change in definitions, an estimated 400,000 "farms" have gone up in statistical smoke.

Despite lower prices for farm products, and a lower farm net, farm land still sells well, and is rising in price. Since 1950 the price of farmland has risen more than 50%.

NEARLY A MILLION ACRES will be made more productive this year . . . with fertilizers

FORTIFIED WITH F·T·E*
(Fritted Trace Elements)

*REGISTERED TRADE MARK OF FERRO CORPORATION

A fivefold increase! Yes, the use of FTE for high-productivity fertilizers has increased 500% in the past three years. Manufacturers have tried them, liked them . . . and their customers, the users of fertilizers, have been happy with the results, so have consistently bought *more and more* "FTE-fortified" fertilizers.

Where trace elements are needed, FTE provides real advantages. Being *fritted,* and slowly soluble on a *controlled,* predetermined basis, FTE stays in the soil (won't leach out) and supplies needed nutrients to crops *all through* the growing season. Equally important, there are no toxicity hazards.

All six minor elements are combined in FTE. Plants get boron, iron, manganese, zinc, copper and molybdenum—exactly as needed. And as little as 1% to 1½% of FTE in the mix has proven effective in commercial fertilizers.

If you're not now using FTE, may we suggest you get some and try it? Now is the time to prove it out for *next* year.

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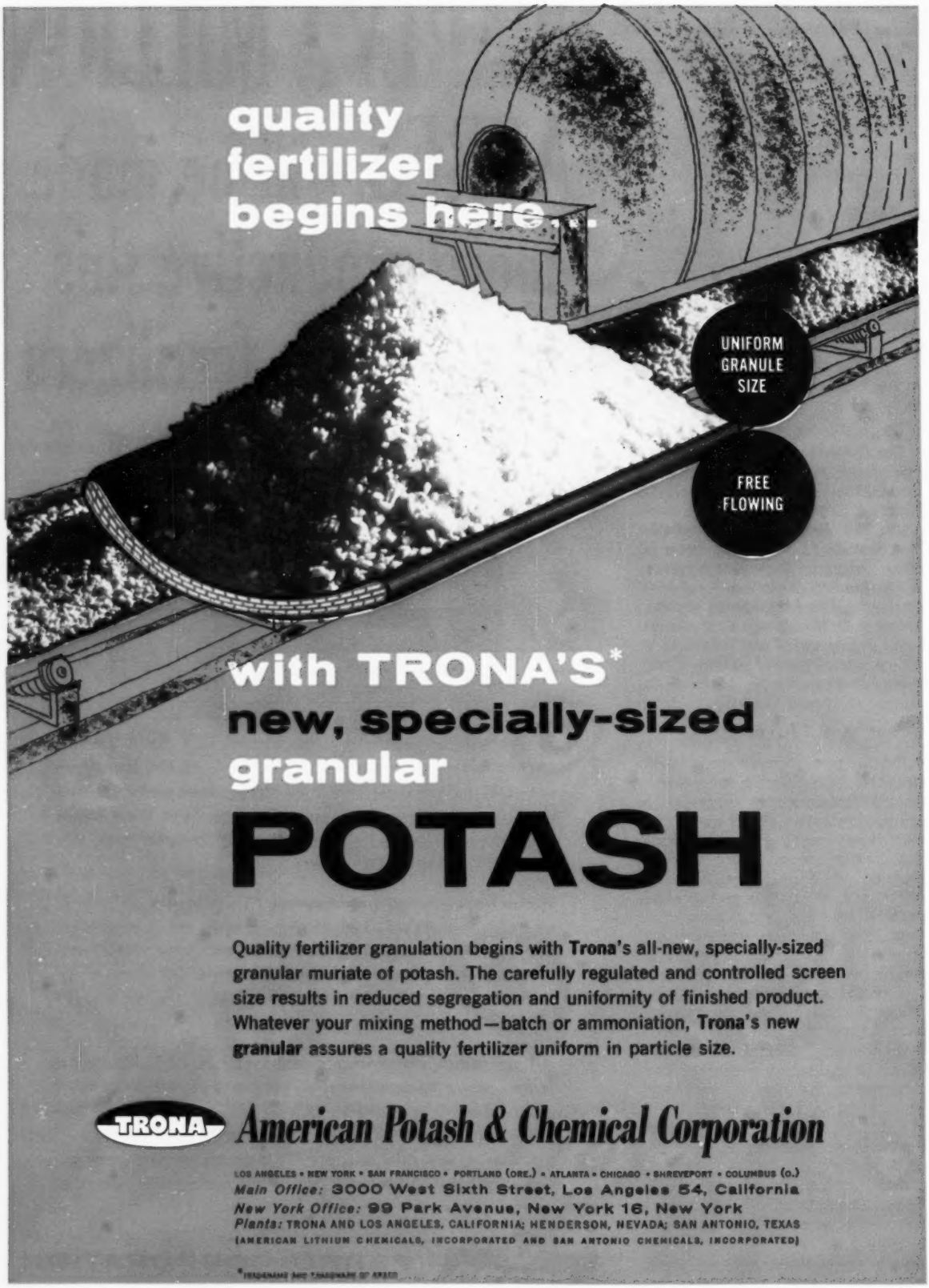

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AAI Meeting Well Attended

Held January 13-15 at Dallas, the Agricultural Ammonia Institute meeting agenda was presented to the usual big group, this year in an optimistic frame of mind. Three days were crowded with activities—which included those to keep Jack from becoming a dull boy. January 12 was devoted to committee and board meetings, the setting up of exhibits—and a party for the early comers that evening.

January 13 saw opening of the trade show and a business session and reports of AAI officers, elections and the like to occupy the morning. The afternoon, following a luncheon meeting, featured an ammonia sales clinic—with part 1 of the Merrett-Adams training program. In late afternoon the Texas group held their own meeting, and a Western party wound up the day.

January 14 morning session featured The Ammonia Story, by Dr. Tom Longnecker and The AAI Story by Jack Criswell and Frank Jordan. The AAI & Producers gave a luncheon to the ladies that noon.

After lunch, H. A. Yeats talked on Credit and Financing, and part 2 of the A. Merrett-Adams sales course was presented. A social hour, a banquet and a dance wound up the day.

January 15. Tom Duffie talked on "A Distributor Reports" and the famed Elmer Wheeler did his "Sell the sizzle, not the steak" pitch.

Northeast Promotion Workshop Successful

Selling a mental concept—a soil fertility program—as opposed to just selling fertilizer was the theme of the National Plant Food Institute's Northeast Fertilizer Promotion Workshop.

The session, third of three experimental meetings authorized by NPFI's board of directors, was held in Hershey, Penn., January 21.

Devoted to a discussion of sales tools and customer motivation, the meeting attracted some 150 representatives and dealers of NPFI members.

Presentations included the potential of fertilizer use in the Northeast, fertilizer economics and sales tools currently available.

The effective psychological approaches to farmer customer received special emphasis.

An evaluation of the program by those in attendance gave it a high rating.

MEETINGS

Novel Idea To Be Featured at Joint Midwest Meeting

An interesting novelty is injected into the 12th annual Joint Midwestern Agronomists-Industry meeting February 11-12. The agronomists will discuss various subjects, and each will have a team-mate from the industry who will then discuss the impact of the agronomist's subject on the industry.

As usual, four schools will be represented on the rotation plan which this group has long followed. The impact of research on agriculture and the fertilizer industry, "case history" reviews of intensified county soil fertililty programs and a report on "The Farmer, the Dealer and Fertilizer Sales, will be among key features.

Dr. George E. Smith, chairman of the University of Missouri's Soils Department will preside at the two-day meeting sponsored by the National Plant Food Institute's Midwest division. Welcoming the agronomists, industry men and visitors will be the Institute's President, J. D. Stewart, Jr., and Dr. Russell Coleman, Executive Vice President.

An added feature of interest will be a showing of the new Institute color movie, "Bread from Stone," a documentary designed to tell the agricultural story of non-farm people.

The first day's program, will open at 1:00 p.m., Thursday, Feb. 11, with a roundup report on the Guernsey County, Ohio Fertility Program. Participating will be Dr. Harold Shoemaker, Ohio State University Extension Agronomist; Oscar Share, County Agent and Harry Cook, Farm Bureau Services, Inc., "interpreting" for the fertilizer industry.

Next will come a summary of the Miami County Fertilizer Demonstration Program by Dr. Gordon Ryder, Ohio State University Agronomist and Norman Arnold, County Agent. H. H. Tucker, Sohio Chemical Company, will discuss the program's significance to the industry.

"Research Progress and Its Importance to the Fertilizer Industry in Michigan" will be discussed by Dr. J. F. Davis, Michigan State University and A. H. Bowers, Swift & Company. A similar report on Indiana will be presented by Dr. S. A. Barber, Purdue University, and Loren Johnson, U. S. Steel Company.

Leading off the Friday morning program will be showing of "Bread from Stone."

Fertilizer research reports from Missouri and South Dakota will follow, Dr. C. M. Woodruff, University of Missouri, will review results in his state, with Victor Sheldon, Olin Mathieson Chemical Corporation, interpreting the research's meaning to the industry. Dr. Lawrence O. Fine, South Dakota State College, will discuss tests in his area, with William M. Mierke, Tennessee Corporation, summing up for industry.

"The Farmer, the Dealer and Fertilizer Sales" will be the subject of a flannel board presentation by Dr. George M. Beal and Dr. Joseph M. Bohlen, Iowa State University Rural Sociologists. The Bohlen and Beal report will summarize results of a survey of 118 fertilizer dealers and 315 farmers.

On the agenda, also, for Friday morning, will be the Midwest Agronomists report on recommended fertilizer grades and ratios for 1960.

Illinois: February 4

February 4 the Illinois Fertilizer Industry Assn. will hold a meeting, beginning at 9:30 A.M. and running into the evening at the Chapmaign Country Club. Discussions will cover limiting factors in corn production and research for the future. There will be an association business meeting.

Iowa Conference

The highlight of the 12th annual Iowa Fertilizer Industry representatives conference was a talk by NPFI vice-president W. R. Allstetter which fits well into what we said editorially last month about being prepared for attack by politicians, and about the confusion over the effect of research on farm income and progress.

"Widespread alarm" he said "has resulted in a great variety of 'solutions' to the farm problem . . . one of the strangest of which is to reverse or arrest the technological re-

volution on the farm." This philosophy he likened to the defense of featherbedding as a means of spreading the wealth.

He had doubts that this thinking would endanger the fertilizer industry, but felt it could well threaten the Land Grant Colleges.

WORK GROUP SEEKS FERTILIZER HANDLING IDEAS

The National Plant Food Institute's Midwest Work Group on Fertilizer Handling Methods is seeking information on improvements in equipment that can help farmers save lifting time and labor in handling fertilizer.

The Work Group, headed by Loren Johnson, U. S. Steel Corp., is part of the Institute's Midwest Research and Education Committee, of which Leo Orth, Sinclair Petrochemicals, Inc., is chairman. Other members of the group are: H. H. Tucker, Sohio Chemical Co., Inc.; Leonard Schrader, Standard Oil Company of Indiana; and Harry Cook, Farm Bureau Services, Inc.

Members of the farm equipment and fertilizer industries are invited to send to Mr. Johnson information on new machinery or combinations of standard equipment which promote convenience and save time, labor and expense in handling fertilizer from the manufacturer's plant through application equipment in the farmers field. Pictures and details of new equipment — how it works, how it cuts down on time and work — would be particularly helpful to the Work Group, he points out.

The Work Group plans to cooperate with the National Joint Committee on Fertilizer Application in gathering and collating information that would be of value to fertilizer handling equipment makers and to encourage them to develop improved machinery.

The importance of this program is indicated by a recent statement by Dr. George E. Smith, chairman of the University of Missouri's Soils Department. He emphasized that improvements in fertilizer distribution equipment are needed to keep pace with changes in agriculture and particularly in the use of plant food.

"I believe we're going to see changes in machinery to cut down the amount of work required to load corn planters," he said. "I think a lot of our farmers, who are good businessmen, are willing to pay a little more for greater convenience and ease of handling plant food.

"Labor is getting to be quite an item and the number of people on farms is considerably less than it was a few years ago. So we're going to need some means of cutting down on the labor and handling of fertilizer."

The Work Group is interested in getting data on equipment for all forms of fertilizer, Mr. Johnson said.

All information should be sent to Loren Johnson, U. S. Steel Corp., 525 William Penn Place, Pittsburgh 30, Pennsylvania.

NORTHWEST ACTIVITY

Moses Lake Corn Club

Moses Lake, Washington, in December saw 200 farmers and their suppliers gather to honor recently enrolled member of a 120 bushel corn club. NPFI, the AES, local seed and fertilizer dealers sponsored this event, and supplied fine trophies for the winner and three runners up, which were presented by the banquet chairman, Glenn Howell.

Dr. B. R. Bertramson, Washington State agronomy chairman, spoke at the banquet on proper management practices to obtain high yields.

The average fertilizer used by the corn contestants contained 180 pounds of nitrogen and 50 of phosphate per acre. The four top yields were 175.0 bu per acre, 172.6 bu, 169.8 bu. and 162.1 bu.

Oregon Conference

Pacific Northwest Plant Food Association held their annual fertilizer industry conference January 14 at Orgeon State. Dr. L. A. Alban, OSC, gave a summary of the soil testing program; T. L. Jackson, OSC, talked on Lime and Molybdenum. The association staged a demonstration program, headed up by Glen Holt, T. A. Steele, Merle Pulliam and Dale Massie.

OSC's O. C. Compton talked on fertilizer effects on prunes and cherries, and there was a panel discussion on fertilizer forage and livestock—this was followed by a general discussion led by H. B. Cheney, OSC.

Spokane Conference

January 29 was the date for the fertilizer industry conference planned by Pacific Northwest. Subjects included how to sell a fertility program—by a panel. The nitrate and moisture test, presented by county agent Felix Entenmann. Soil testing, by A. R. Halvorson of Washington State soil testing specialist.

After lunch F. E. Koehler, Washington State, spoke on new varieties and plant nutrients. A banker, Edward Jarboe, took a look at fertilizer. C. D. Moodie, Washington State soil man spoke on factors affecting utilization of plant nutrients.

And a panel wound up the day with "Recommendations for N. P_2O_5 and S."

Central Washington Conference

January 25 at Pasco, Pacific N.W. staged their Dealer Day Meeting with these items for discussion: Hop fertilizer practices; hop die-out; new fertilizer market potentials; pasture-forage; corn production; fertilizer practices; sales, credit, employee relations, education problems, distribution and handling costs and problems.

Eastern Idaho

The Eastern Idaho Plant Food and Chemical Association met recently in Idaho Falls to elect new officers for the coming season. 70 dealers and distributors were on hand for the business-banquet meeting. Jack Wursten of Simplot Soil Builders was elected president. Wilber Brown of Rogers Bros. was elected vice-president and Lyle Whiting of Jefferson Co'op. was re-elected secretary-treasurer.

The primary objectives of the Idaho association are to sponsor educational programs to expand the use of commercial fertilizer and farm chemicals and to encourage the enactment and interpretation of laws to benefit the industry.

Speakers included Ben McCollum, sales manager for J. R. Simplot Co., and F. Todd Tremblay, regional director of National Plant Food Institute.

MOUNTAIN STATES

Colorado Conference

The eighth annual Colorado fertilizer conference was staged by and at the State University, and sponsored jointly by the CSU Agronomy

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Department and the Rocky Mountain Plant Food Assn., January 8-9. Topics included use of fertilizer and insecticide mixtures, economics of fertilizer use, land reclamation through the use of fertilizer and fertilizer financing.

Intermountain Conference

The Intermountain Meadow and Range Fertilization Conference, the first of its kind, is planned for Feb. 19, at Colorado State University's Student Union Building. The western regional office of National Plant Food Institute is cosponsoring the conference with the Colorado Cattlemen's Association.

This fertilization conference is being held in conjunction with the annual meeting of the Colorado Section of the American Society of Range Management (ASRM), which continues the following day.

Dr. Donald Hervey, president of the ASRM and head of the Colorado State University Department of Range Management, will officially welcome ranchers, range managers, official agriculture workers, and fertilizer industry representatives to the conference. Highlighting a luncheon will be an address of Dr. Merton Love of the University of California, past president of the California Section of the ASRM. His topic: "The Challenge of our Range and windlands."

Other presentations of interest in the intermountain area are: "Mountain Meadow Fertilization"—Forrest Willhite, ARS, USDA; "Economics of Mountain Meadow Fertilization" —Dr. Elmer Hunter, ARS USDA; "Rancher Results from Meadow Fertilization" — R. D. Anderson, SCS, USDA; "Why Do We Fertilize Mountain Ranges?"— Dr. Dixie Smith, University of Wyoming; "Range Fertilization Progress on Colorado Native and Reseeded Ranges"—Dr. Don Hervey, Colorado State University; "Increased Forage and Beef Production from Fertilization"—Dr. Roy Lipps, U. S. Steel Corp.; "Holland Ranch Fertilization Results"— Ralph Holland, Laramie, Wyo.; and "Wagnild Ranch Fertilization Results"— Don McMillan, Colorado State University. Dr. Richard B. Bahme, NPFI Western regional director, will give a showing of the NPFI film "Cash in on Grass."

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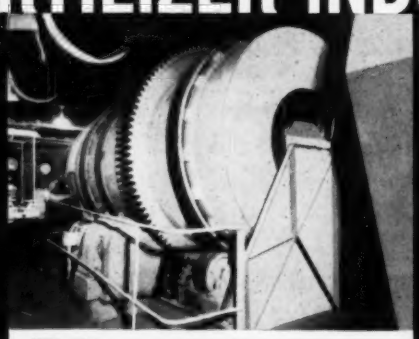

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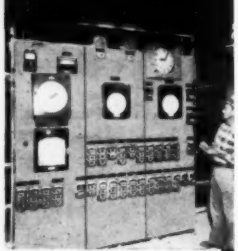

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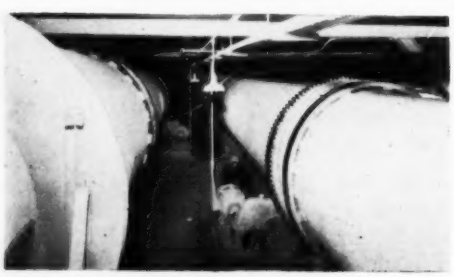

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SOUTHWEST

Oklahoma: April 28-29

More than 20 States and representatives from 12 foreign nations are among those who have indicated participation in the International Land, Pasture and Range Judging. The objective of the event is education in soil and water conservation, pasture development and native grass management. For free brochure, write Edd Roberts, Oklahoma State, Stillwater.

Texas Fertilizer-Limestone

January 5-6 Texas A&M held a Fertilizer and Limestone Conference at College Station. Discussed were such subjects as finance, fertilizer laws, soil fertility, specific crop discussions on the general theme of irrigation, in specific Texas areas. The second day, a morning program was themed on resources in fertilizer research. The next such program is scheduled for January 9-10 next year.

Ervin Peterson, assistant secretary of agriculture, told the American Association of Land Grand Colleges and State Universities: "We will have a population of 230,000,000 by 1975 . . ." and we need to increase production 45% in the next 15 years.

SOUTH

Georgia Society Elects J. B. Amos

Georgia Plant Food Educational Society elected J. B. Amos of Etheredge Guano Co., Augusta, as president for 1960 at its meeting January 14 at Athens. He succeeds G. L. Dozier of Central Georgia Fertilizer Co., Macon, who becomes director-at-large.

J. Fielding Reed of American Potash Institute, Atlanta, was re-elected secretary-treasurer, and Lee DeYoung of Southern Nitrogen Co., Savannah, was named assistant secretary-treasurer.

New vice president for the northeast district is William G. Neuhaus, Armour Agricultural Chemical Co., Augusta. Other directors for the district are: Harry M. Arnold, Jr., H. M. Arnold Fertilizer Co., Monroe; William L. Baughcum, International Minerals & Chemical Corp., East Point; and Jerome Dollar, F. S. Royster Guano Co., Macon.

R. H. Woodward of Swift & Co., Atlanta, became vice president for the northwest district, and other directors are: W. A. Jackson, Tennessee Corp., East Point; Sam McGowan, Southern Cotton Oil Co., Cartersville; and Quentin Lee, Cotton Producers Assn., Atlanta.

The southeast district is headed by Vice President Cecil E. Carroll, Carroll Fertilizer Co., Dublin, and additional directors are: C. B. Compton, Southern States Phosphate & Fertilizer Co., Savannah; Ernest M. Thorne, Millen Fertilizer Co., Millen; and J. E. Hall, Jr., Soperton Guano Co., Soperton.

New southwest district vice president is Paul Renfroe, Virginia-Carolina Chemical Co., Albany. Other district directors are: R. G. Dozier, Jr., Stevens Industries, Dawson; E. R. Culberton, Georgia Lime-Rock Co., Albany; and Jack C. Smith, C. O. Smith Guano Co., Moultrie.

Other directors are: C. C. Murray, dean of the College of Agriculture; George King, director of Agricultural Experiment Stations; and W. A. Sutton, Agricultural Extension Service director.

Theme of the meeting was 'Our Farmer Customers — T o d a y and Tomorrow.' Roger Woodworth, associate agricultural economist at the University, told 'Who He Is,' describing statistically the age, educational status, and other characteristics of the farmers and the farms they operate, outlining the changes and trends for each.

Jim Bergeaux, extension agronomist, told 'What He Does and How He Does It.' He revealed data on crop and fertilizer practices, and on farmers' knowledge about and attitudes toward recommended practices.

G. Y. Duke, district agent, presented highlights of a local-level study of farmers' information sources, about fertilizer, with relative rankings of these sources for different types of information.

J. B. Amos and W. A. Sutton described the action that is indicated for the fertilizer industry and the extension service, respectively, in view of the new information and anticipated changes in agriculture.

Ralph Johnson, extension agronomist spearheading the soil fertility program, briefed the audience on the expanded scope of this extension program which has earned the enthusiastic support of the fertilizer industry and related groups.

(Concluded on page 62)

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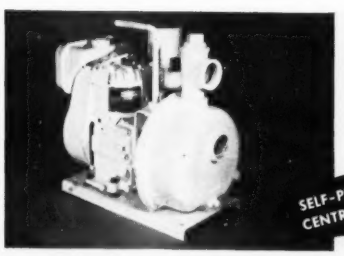

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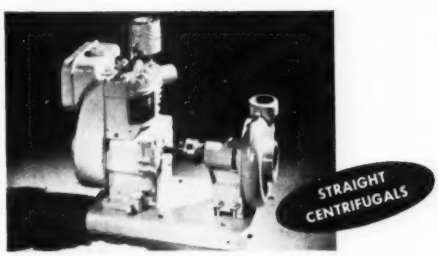

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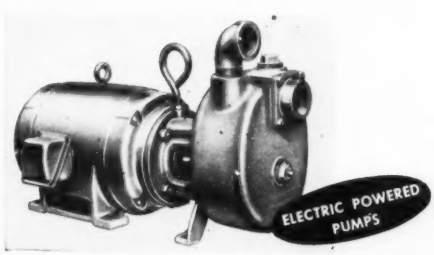

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Louisiana Conference To Be February 17-18

The Louisiana Fertilizer Conference will be held February 17-18 at Capitol House, Baton Rouge, with registration beginning at 11:30 a.m. on the initial day.

The opening session will begin at 1:30 p.m., with Voris King of Kelly Weber & Co., Lake Charles, vice president of Louisiana Plant Food Educational Society, as chairman. L. Norman Efferson, dean of the College of Agriculture, will welcome the group, and M. B. Sturgis, head of the Agronomy Department will discuss why fertilizers are so important to Louisiana agriculture.

J. Y. Oaks, J. G. Marshall, J. H. Hendricks and W. H. Patrick of the Agronomy Department will speak on fertilizer requirements for cotton in the alluvial area. B. E. Newman and S. A. Phillips of Agronomy will talk about fertilizers for cotton on upland soils.

L. G. Jones, horticulturist, will discuss fertilizer requirements of horticultural crops. Agronomist W. E. Monroe will speak on pasture fertilization, and Louisiana Plant Food Educational Society President N. D. Morgan of American Potash Institute, Shreveport, will tell how yield and size of operation determine income from pastures.

Chester Green of Green & Reedy, Franklinton, will be MC at the banquet that evening.

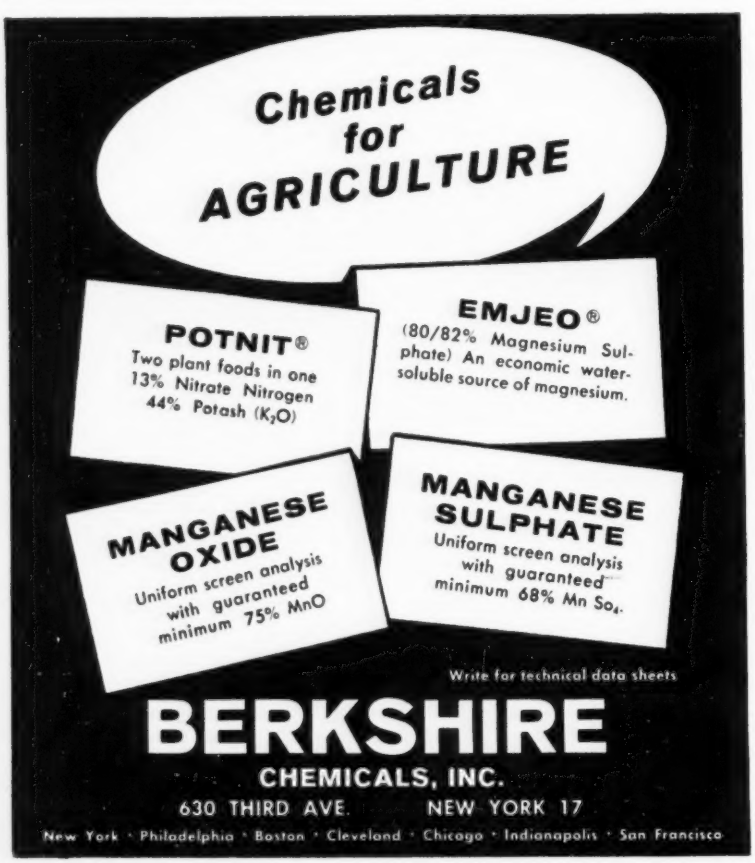
Louisiana PFES Treasurer W. Floyd Williamson of Louisiana Agricultural Supply Co., Baton Rouge, will be chairman of the second day's meeting, beginning at 9:00 a.m. and concluding at 11:00. University agronomists will cover a variety of topics at that session. Lee Mason and B. E. Newman will discuss corn and its fertilization. L. E. Golden will speak on fertilizers for sugar cane, and R. J. Miears will talk about fertilizer requirements for the rice area.

Developments in the Louisiana system for soil testing will be the topic of W. J. Upchurch, and W. J. Peevy will describe what the fertilizer industry can do for the fertility program.

Immediately following the close of the meeting, the Louisiana Plant Food Educational Society will hold a business meeting.

Industry Meeting Calendar

DATE	EVENT	LOCATION	CITY
	1960		
Feb. 9-11	S. E. Liquid Fertilizer Conference	Rock Eagle Park	Eatonton, Ga.
Feb. 11-12	Midwest Industry-Agronomist Meet	Edgewater Beach Hotel	Chicago, Ill.
June 12-15	National Plant Food Institute	Greenbrier Hotel	White Sul. Spgs., W.Va
July 27-30	Southwest Fertilizer Conference	Galvez Hotel	Galveston, Texas
Oct. 5-6	Southeast Fertilizer Conference	Biltmore Hotel	Atlanta, Ga.
Oct. 17-18	Fertilizer Safety Section	LaSalle Hotel	Chicago, Ill.
Nov. 2-4	Fertilizer 'Round Table'	Mayflower Hotel	Washington, D. C.
Nov. 9-11	National Fertilizer Solutions Assn.	Peabody Hotel	Memphis, Tenn.
Nov. 13-15	California Fertilizer Association	del Coronado Hotel	Coronado, Calif.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Mississippi Council Formed at Biloxi

A new organization to be known as the Mississippi Soil Fertility and Plant Food Council was formed at a meeting of the Mississippi Fertiliizer and Agricultural Workers Conference at Biloxi January 23.

H. S. Gordon, Jr., was named president, and Mike Blouin, Jr., vice president. The advisory committee, with Si Corley, commissioner of agriculture, as chairman, will serve as the board of directors for the organization.

Sugar Beet Meeting Hears Fertilizer Topics

Studies on sugar beet fertilization had a prominent place on the program of the American Society of Sugar Beet Technologists meeting in Salt Lake City, Utah, February 2-5.

This 11th annual meeting program consisted of six sections—agronomy, genetics and variety improvement, entomology and plant pathology, agricultural engineering, chemistry and factory engineering, and physiology.

HONORS

American Chemical Society

Travis P. Hignett, chief of TVA Division of Chemical Developments' applied research, has been elected chairman; John O. Hardesty, USDA, vice-chairman; Dr. Lawrence B. Hein, Blockson Chemical, division of Olin Mathieson, secretary treasurer of American Chemical Society's fertilizer and soil chemistry division. Outgoing chairman is M. D. Saunders, Swift & Co.

Paul E. McCoy

Paul E. McCoy, American Potash & Chemical has been elected Secretary of the Salesman's Association of the American Chemical Industry, Inc.

Thornton Kennedy

The Young Presidents' Organization has elected to membership Thornton Kennedy, president of Davidson-Kennedy company and Davidson-Kennedy Associates Company plant designers and equipment fabricators.

The Young Presidents' Organization now has over 1500 members in nine nations, all of whom have risen to the presidency of a sizable corporation while still in their twenties or thirties.

AWARDS

Dharamsi Morarji Chemical

Dharamsi Morarji, fertilizer manufacturers of Bombay, India, have set up, with Government approval, a competition known as the Paddy Pilot Scheme. In each block of the "scheme" there are prizes of 200 and 100 rupees, with 500 rupees at the State level for the cultivator who obtains the highest yield. The program is to run for three consecutive years.

The purpose is to demonstrate the value of plant food properly applied, in conjunction with other management practices.

TVA Cuts Production 8.6%

While TVA is busy building a pilot plant to carry forward their studies on commercial wet-process phosphoric acid in high-analysis solid and liquid fertilizers, and while their chemical engineering group is hard at work on further high-analysis research, the production of TVA fertilizer materials for demonstrations has been cut 8.6%.

In addition to the high analysis work, TVA will stress demonstration projects to show ultra conservative farmers that it is good to fertilize close-growing hay and other pasture crops.

Owens-Illinois to Produce Plastic Shipping Sacks

Owens-Illinois Glass Company, packaging products manufacturer, has announced it will begin production this year of a heavy duty plastic shipping sack for industrial and agricultural products.

Manufacture and sales of the polyethylene-based sack will be handled by O-I's Multiwall Bag Division, which produces multiwall paper bags for shipment of similar products.

Tom W. Brown, Jr., general manager of the division, said limited production of the plastic bag will begin by next spring with full production scheduled for late summer. Initially the bags will be manufactured in a location adjacent to the company's Technical Center in Toledo, Ohio.

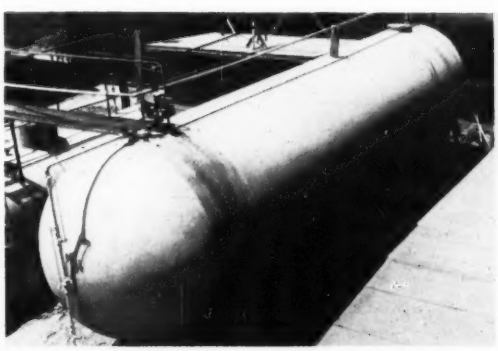
John R. Murphy, formerly assistant to Mr. Brown, is manager of the new plastic bag operation. Duane H. Bond, who has 10 years experience in plastic packaging research, will be plant superintendent.

Non-skid Adhesive For Polyethylene Bags

A new water-soluble polymeric adhesive which prevents slipping of palletized polyethylene industrial shipping bags has been announced.

Designated PM-22, the new material is said to resist horizontal shear and permit easy vertical separation of the stacked bags. Because it is water soluble, the new adhesive can be removed easily and does not damage printing or stenciling, the announcement said. The absence of organic solvents eliminates toxicity and fire hazards.

The new material, currently offered by five firms, is based on a carboxyl containing copolymer made by Monsanto Chemical Company's Plastics Division.



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Old as man against nature —

Farmers Meet to Seek Lost Image of Pacesetter

Last month we point out the confusion that reigns among those who would advise the farmer. But here is a story, written by a newspaper reporter who attended a meeting of dirt farmers held in Atlanta last month. And the farmers are not nearly as confused as their counsellors. Read it. There's an angle here for every fertilizer salesman in the United States. Ed.

by Phil Smith*

Winter comes early, leaves late, in South Dakota. It whips fiercely over the wheat fields, and leaves behind a burden of snow. Winter is a challenge there. To a farmer, it is as old as man against nature.

"Why, I came here with my German parents who settled here. There were seven of us. Seven of us boys. All of us grew up here. Where are they now?

"One's a doctor in St. Louis, one's a bus driver in Illinois. One works for a microfilm company. All are gone.

"Except me. I farm 1,100 acres, just like my father did.

"They leave the farm. They go to California. The hands have gone. They're in the aircraft factories. They're in the big cities of the East.

"And I might say it's sad, the first ones to curse the farm are the ones who grew up on it. They hate the farm. Perhaps, they hate their own past. But the hate remains.

"Still, I'll stay on the farm. There's others like me."

And so, the farmer from South Dakota who didn't go to California when depression came sits and talks at a banquet hall about his life. The man from Florida says much the same.

He's not bothered by the cold. The sweetness of the citrus and the warm weather bring insects, though. And from Ohio, a cousin of Lou Gehrig takes his turn at bat about his farm.

It's rough," he says, "but we will survive."

The scene is the Atlanta Biltmore. The meeting is the National Council of Farmer Cooperatives. The not-quite-vanished American sits on a plush sofa and discusses his knotty problems. The farmer has many, he admits. And he admits he doesn't know how to solve them.

These are lonely men, misunderstood Americans who once belonged to the most popular group, but now, like the railroaders, are somehow holding on, but not leading the pack.

Listen to them talk:

Clarence Gehrig, a gray-haired man, robust, and executive looking. He owns farms in Ohio and Kentucky. **He's a big farmer, and proud of it, in a concerned way.** He raises livestock. These are some of his views on his role in the economy:

"Why if farmers were paid the scale of the steelworker, a quart of milk would cost $12. Soil bank? Has it helped? Yes, it's helped the man who didn't want to help himself. It's been good to the old gray-headed ladies in the hill country who had poor soil

* The Atlanta Journal and Constitution, January 10, 1960.

to begin with and turned it out and let it fallow. It wouldn't grow much anyway.

"But in the rich lands of Ohio, the farmer didn't want soil bank. His soil's rich, and he sees the shame of not cultivating it . . . "

He goes on quickly: "When they couldn't plant as much acreage, these men on the good soils, planted their rows close together. Put on more fertilizer. Sometimes as much as 2,100 pounds an acre. It didn't keep production down and the surplus goes on.

"The buyer of farm products could help us. He could take only the best quality. He could pay a higher price. You hear a lot of talk about the bad aspects of being a big farmer. **Well, let me tell you there is a place for the little farmer. The little farmer can do big things. We, farmers, we're not licked by a long sight."**

The citrus man, Al Whitmore, from Florida joins in: "What are our problems? Well, they're about as many as you can count in digits. We've got to start organizing. Our task is to grow the best. To give the best at the lowest cost. **Buyers now want big lots of stuff, different types. If we pool all of our produce into big warehouses, we can give them quickly what they want. The day of the individual farmer is past.**

And the egg producer from Michigan, L. A. Cheney, interrupts: "There're fewer buyers for our stuff, now. They're all gone big time. Everything in America has gone big time. Big corporations. Big everything. **The only way we can compete is to join together and be as big. We, farmers, are not the bigshots in America any more. But if we join together and distribute production, we can come through it all.**

And an observer comments: "It's not popular to be a farmer now. Why in Georgia everybody's living down their past as farmers. Trying to forget they had to pick cotton. **But watch this generation. They don't know the farm. They'll turn back to it.**

"What's the old saying? Shirt sleeves to formals and back to shirt sleeves. This generation that's forgotten the farm, will get new interest in it. That's the way everything works. **When something gets so unpopular, it gets popular."**

And so the smouldering to organize, to rectify a situation, to blame, to take blame goes on.

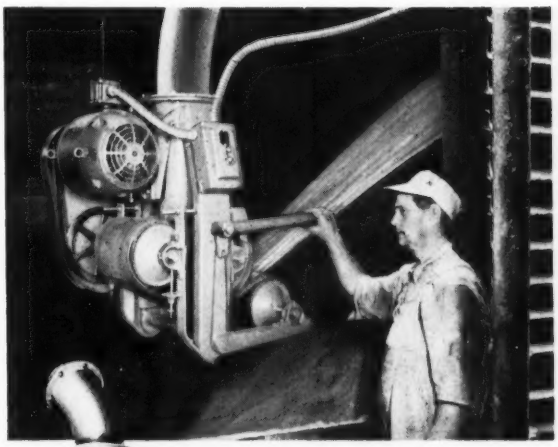
It's an old problem, bandied about in pessimistic talk, but because there are talk and concern there is optimism, for this old-man-and-the-soil thing is not the thing of farmers falling back in a technological moon-seeking economy. It's as old as famine on the land, and the locust blight, and the men at the Biltmore in quiet conversations are taking swats at locusts, at least verbally.

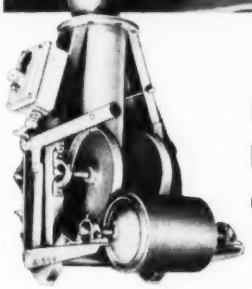
They might need a bigger swatter, even the conversants say, but they're pretty sure some day they can find the locust. He might walk in government clothes, this 1960 locust, or he might walk in a public that no longer cares about his farmer past, but he's being sought in heated bull sessions.

"Farmers? Problems? The fruit grower from Pennsylvania sums it up:

"Sure, we've got problems. Who hasn't? Maybe there is a difference. We can't quite figure ours out. Oh, well, I've got to go talk to that man from Nebraska. I understand he's the only one that grows the kind of wheat that is not surplus. I wonder what he's got to say . . . "

And so they go on, trying to produce a surplus, but trying to find the man who hasn't because he's successful.





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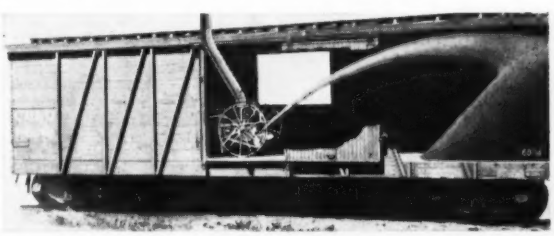

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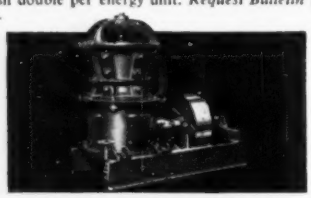
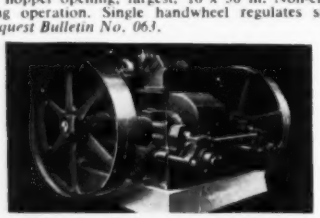
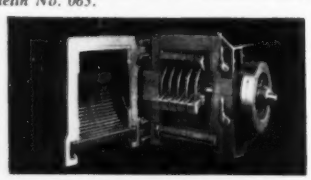
Jaw Crushers — Produce coarse (5 in. largest model) to fine (⅛ in. smallest model). Eight models range from 2 x 6 in. jaw opening (lab model) to 12 x 26 in. Capacities to 30 tph. All except two smallest sizes operate on double cam principle — crush double per energy unit. *Request Bulletin No. 062.*



Rotary Fine Crusher — Reduce soft to medium hard 3 to 8 in. material down to ¼ to 1¼ in. sizes. Capacities up to 30 tph. Smallest model has 6 x 18 in. hopper opening; largest, 10 x 30 in. Non-clogging operation. Single handwheel regulates size. *Request Bulletin No. 063.*



Crushing Rolls — Reduce soft to hard 2 in. and smaller materials to from 12 to 20 mesh with minimum fines. Eight sizes, with rolls from 8 x 5 in. to 38 x 20 in.; rates to 87 tph. Three types — Balanced Rolls; Plain Balanced Rolls; Laboratory Rolls — all may be adjusted in operation. *Request Bulletin No. 065.*



Hammer Mills — Reduce to 20 mesh. Swing-Sledge Mills crush or shred medium hard material up to 70 tph. Hinged-Hammer Pulverizers crush or shred softer material at rates up to 30 tph. Four Swing-Sledge Mills with feed openings from 6 x 5 in. to 20 x 30½ in. Four Hinged-Hammer Pulverizers with feed openings from 12 x 12 in. to 12½ x 24 in. *Request Bulletin No. 084.*

**Reports Manager W. Carleton Merrill concerning Sturtevant Swing-Sledge Mill at James F. Morse Co., Boston.*

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Research Results & Reports

Ground Climate Varies From Air Climate

The microclimate—that around growing crops in the field— often varies widely from the macroclimate —that in which man lives and which is measured by the various weather stations.

This has been illustrated in studies at the University of Florida Agricultural Experiment Station by a research team in the agronomy department. Members of the team include Dr. G. M. Prine, Dr. O. C. Ruelke, Dr. S. H. West, Dr. V. N. Schroeder and Keith Butson. They use a mobile laboratory.

They have found that on a fair September day in Gainesville the temperature measured in a five-foot weather shelter was 92° F., while that of an alfalfa stem recently defoliated by cutting for hay was 129° F. Temperatures above 140° F. have been measured at the surface of bare soils in Florida.

Temperature of the soil at a 1-inch depth and air at 3- and 12-inch heights at the middle of a fair day in December was as much as 7 to 10 degrees higher in rows of sweet blue lupine running north and south than in those running east and west. Sunshine reached the ground in the north-south rows, not in the east-west ones. Winds and clouds reduced the temperature differences between plots.

Grain And Legume Seedings Need More Potash

Dairy and livestock farming can eat up the soil's potash reserves rapidly, according to Prof. C. J. Chapman, nationally known soils specialist at the University of Wisconsin, in the heart of the nation's dairyland.

In a current study showing the need for more potash on grain and legume seedings, Prof. Chapman cites specific evidence of how potash reserves are running low in his area. His evidence shows:

(1) During the past 15 years, 79% of all the soil samples tested in the state soils laboratory have shown a deficiency of available potassium. (2) This year, Wisconsin harvested a total of 9½ million tons of alfalfa and clover, both heavy potash users draining it from the soil. (3) Other crops are responding more and more to fertilizers high in potash. (4) On the average Wisconsin dairy farm, not more than 45% of the potash contained in crops fed to livestock actually finds its way back to the cultivated fields. (5) Fertilizers used on Wisconsin farms contain a higher percentage of potash than they did 10 years ago—in fact, the average potash content of mixed fertilizer in Wisconsin in 1957-58 was 20.28% K_2O, highest in the nation. (6) There is a strong movement to broadcast potash on corn fields and plow it under and to broadcast potash or mixtures like 0-10-30 and 0-12-36 with or without boron as topdressings on old alfalfa fields.

Complete details of Prof. Chapman's report can be secured by writing Better Crops Report L-10-59, American Potash Institute, Inc., 1102 16th St., N. W., Washington 6, D. C.

Recognition Of Acid Soil Problem

Several recent research findings indicating the complexity of the problem of high soil acidity in many U. S. Agricultural areas were reported today by the USDA.

A trend toward increased use of nitrogen fertilizers coupled with reduced use of liming materials is believed by soil scientists of USDA's Agricultural Research Service to be a factor of increasing importance in increased soil acidity in the last decade. More than 50 field experiments being conducted by ARS in cooperation with State experiment stations on 23 agriculturally important types of soil are helping to show how soil acidity decreases crop yields.

Nitrogen Boosts Corn Protein Content

Nitrogen fertilizer may increase the feed value of corn for ruminants, like cattle and sheep.

University of Minnesota research shows that corn plants in fields receiving extra nitrogen had a higher percentage of crude protein.

Nitrogen-fertilized corn also produced more crude protein per acre. Time of application, though, had no effect on amount of percentage of protein.

"Crude protein" is an estimate of total protein, based on nitrogen content of the entire corn plant.

Research . . .

Fertilizer Beats Drought

Well fertilized crops stand up better during a drought than do poorly fertilized crops says Dr. E. R. Collins of the Department of Field Crops at North Carolina State College in Raleigh. This statement is borne out by the experience of farmers who make a habit of applying adequate amounts of fertilizer to their soils thereby getting efficient crop production each year, but especially during times of drought.

It is generally known that a well fertilized vigorous plant also has a large root system. Therefore, during the hot time of the day and especially during a drought season, the healthy root system can reach beyond its own little area of soil to obtain moisture in order to survive.

In addition to making these roots larger in order that they may grow faster to new areas of moisture, the plant roots that were fertilized are protected from excessive loss of water during periods of drought. But on the other hand, says Dr. Collins, very low levels of soil fertility, especially potash, result in the accumulation of iron in the plant. This decreases the movement of food to the roots and results in starved weakened roots with lower moisture supplying ability.

Soil Fertility Records Important

In the years just ahead—where margins of profit will be smaller and competition closer—it is going to be as important for a farmer to know why his crop in one field dropped below par as it is to know how to follow soil test recommendations that might remedy the problem.

And to develop more "know-why" ability, N. C. State College soil should keep soil fertility records—systematic accounts of soil test results and the fertilizer and lime scientists, W. C. White and G. D. McCart, suggest more farmers used on each field on their farms.

"Interest in recommendations alone sells soil testing short," the N. C. State specialists emphasize. "A farmer who really wants to know what his fertilizer and liming practices are doing for him should look closer than crop yield response. He should consider the effects on his soil fertility levels—that is, know what's happening to the nutrition of his soil. This requires careful record keeping."

Complete details of White and McCart's report can be secured by writing Better Crops Report M-10-59, American Potash Institute, Inc., 1102 16th St., N.W., Washington 6, D. C.

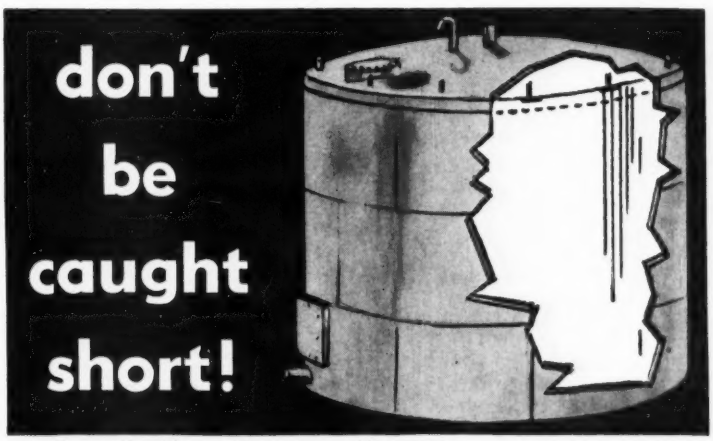
Fertilizer Pays Off In Dry Weather

Dry weather—no matter how well you can predict its coming—is no reason to use less fertilizer.

The fact is that healthy plants take drouth better than starved ones. And fertilizer helps keep the plants healthy, according to Curtis Overdahl, extension soils specialist at the University of Minnesota.

No matter what the moisture outlook, Overdahl calls reducing fertilizer use a poor place to economize.

Spuds Johnson, Florida's pungent writer on things agricultural, points out that people had better stop saying that we don't need agricultural research any longer, but had better look ahead as the population explosion develops need.



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REGULATIONS and TONNAGE NEWS

Midwest Nutrient Content Reaches New Peaks

In one of the steady barrage of news releases it sends out to farm papers through the corn belt, National Plant Food Institute's Midwest regional office at Chicago points out that in recent years plant nutrient content of mixed fertilizers in seven Midwestern states has risen from 28.18% to 38.86%. And in five other corn belt states it has risen from 26.28% to 36.22%.

Commerce Report Sees Fertilizer Holding Gains

Fertilizer production and sales reached new heights in 1959, nearly 10% above 1958, the Department of Commerce reported recently. The Department's Business and Defense Services Administration reports 1959 shipments of all major fertilizers at $1.1 billion, and predicts that industry activity will hold close to last year's levels during 1960.

Fertilizers accounted for about one-fourth of one percent of the gross national product, but represented 4½% of the sales of all chemical manufacturers.

Spot shortages may develop during the spring peak in phosphoric acid and ammonium sulfate, the report states, but supplies in general should be adequate during the year.

Declining farm income this year may hurt fertilizer sales slightly the following year, according to the department, but adverse effects will be less than in the past from this factor.

4-10-7 Led '58-59 Sales In Alabama

A recent report by Alabama's Department of Agriculture and Industries showed 4-10-7 as the leading grade of mixed fertilizer, with sales of 268,313 tons of the state total of 1,045,562 for the year ending June 30, 1959. Second grade was 4-12-12 with 251,078 tons, and 0-14-14 was in third place with 125,570 tons.

Leading direct-application material was ammonium nitrate with sales of 81,057 tons, followed by nitrate of soda at 75,338 tons.

Sulfur Use Shows Substantial Gains

Total U. S. consumption of sulfur rose in 1959 despite the steel strike, according to a report from Fred M. Nelson, board chairman of Texas Gulf Sulphur Co., world's largest producer.

Domestic consumption reached a near-record level of 5,835,000 long tons, 11% above 1958 levels. Although domestic production actually was some 30,000 long tons behind 1958 output, inventories were lower at year-end than twelve months earlier.

Exports by U. S. producers continued to increase in 1959, and imports, coming primarily from Mexico, likewise increased.

Fertilizer-Pesticide Mixes Okayed Again by N. C.

At a meeting of the North Carolina Board of Agriculture last month new rules and regulations were passed to authorize limited sale of fertilizer-insecticide mixtures for use on certain crops in the state. The move reversed the board's earlier decision to curtail sale of these mixtures for agricultural crops, and came in response to repeated complaints from two sections of the state asking for relief with respect to fertilizer-insecticide mixtures.

In a subsequent order, the board placed additional restrictions on the use of fertilizer-heptachlor mixtures as an aftermath of the Federal Food

CF Staff-Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

	December		November		July-Sept. Quarter		January-June		July-December		YEAR (July-June)	
STATE	1959	1958	1959	1958	1959	1958	1959	1958	1958	1957	1958-59	1957-58
Alabama	18,434	19,521	32,554	29,453	91,258	90,651	846,309	734,077	199,265	172,721	1,045,574	906,798
Arkansas	5,376	5,434	3,019	4,062	41,802	42,100	289,365	226,889	64,092	62,752	353,132	289,641
Georgia	54,544	49,835	53,804	87,336	135,678	107,373	1,130,998	944,618	294,751	269,529	1,425,749	1,214,147
Kentucky		17,439*		7,210*	49,489	38,396	483,821	435,023	99,460	88,771	583,281	523,794
Louisiana	6,670	6,511	10,816	10,677	35,276	29,933	201,642	188,409	64,152	64,192	265,794	252,601
Missouri		44,459*	23,877	40,147	147,812	164,296	563,055	420,615	370,036	335,312	926,111	755,927
N. Carolina	42,969	33,256	40,883	27,189	60,446	89,602	1,468,704	1,261,685	228,055	199,446	1,641,674	1,461,131
Oklahoma	1,724	2,589	4,606	3,478	45,939	43,410	64,738	55,964	68,848	51,436	133,586	107,400
S. Carolina	22,132	18,332	22,096	23,140	47,443	58,100	756,100	615,733	134,202	116,874	890,302	732,607
Tennessee	10,479	10,352	7,408	4,503	78,916	79,343	443,602	307,182	127,116	135,717	570,718	442,899
Texas	33,196	36,623	31,631	30,246	115,509	103,794	441,851	452,327	222,800	213,801	664,651	666,128
California		(reports compiled quarterly)			204,000	206,327	803,261	679,577	450,767	441,969	1,254,028	1,121,546
Virginia		(reports compiled quarterly)			68,631	76,031	618,965	549,773	160,178	140,783	779,143	690,556
Indiana		(reports compiled semi-annually)					856,316	795,506	316,341	284,959	1,172,657	1,080,465
New Hampshire		(reports compiled semi-annually)					16,143	16,053	4,746	3,966	20,889	20,019
Washington		(reports compiled semi-annually)					------	158,286*	75,350	77,498	------	235,784*
TOTAL	195,524	182,443	198,140	260,231	1,122,199	1,129,356	8,984,870	7,683,431	2,880,159	2,659,726	11,727,289	10,265,659

------ (not yet reported) * Omitted from column total to allow comparison with same period of current year.

and Drug 'zero tolerance' ruling for this insecticlde under certain conditions for food and forage crops. (see page 54 for story).

Illinois Tonnage Set New Half-Year Record

Illinois fertilizer sales for the first half of 1959 topped all previous six-month periods. The University of Illinois Agronomy Department based this report on data supplied by 73 fertilizer manufacturers in the state.

Tonnages of mixed goods and nitrogen materials were 20% above those of the same period in 1958. Use of phosphate and potash materials remained about the same.

In mixed fertilizers, over half the tonnage continued to be in the 1-1-1 and 1-4-4 ratios. There were also increases in such ratios as 3-1-1 and 2-1-1, which account for part of the hike in nitrogen usage.

In straight nitrogen materials, anhydrous ammonia showed the biggest rise, more than 50 per cent. Increases of 10 to 40 percent were also reported for other major nitrogen materials.

Red China Progressing, But Still Lags

Communist China, despite her huge grain yields, so far has succeeded in mechanizing only four percent of her total farm area under cultivation, and only ten percent of the irrigated land. Some 55,000 tractors are in use—one for each 10,000 farmers — and the average tractor has a 15 horsepower engine.

More impressive strides have been made in the use of chemical fertilizers, however; tonnage has grown from about 60,000 tons in 1954 to more than 2,700,000 tons last year.

S. C. Tonnage Down 22%; 4-12-12 Leading Seller

The South Carolina Fertilizer Inpection and Analysis office reported last month that the state's tonnage of mixed fertilizer and materials for the six-month period ended December 31, 1959 was 104,903 tons, a decline of 21.8% from the same period of the preceding year.

Leading grade of mixed fertilizer for the period was 4-12-12, with a total of 35,171 tons; next was 3-12-12 with 8267 tons, followed by 5-10-10 with 6656 tons.

World Nitrogen Use Climbed 10.3% Last Year

World production of nitrogen in all forms during the year ended June 30, 1959, totaled 11,250,000 metric tons, an increase of 8.8% over the 10,339,000 tons total of the preceding 12 months, according to an estimate by the British Sulphate of Ammonia Federation, Ltd.

World consumption of nitrogen for the 1958-59 fertilizer year was estimated at 11,091,000 metric tons, increase of 10.3% over the 10,059,000 total for the preceding year.

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